ELECTRICAL REVIEW

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VIEWS, NEWS AND INTERVIEWS.

Chimes operated by electricity will peal from the steeple of Grace Church, New York city, on Easter day.

An immense wooden box, bound in iron, was recently found at Helsinfors, in Finland, by workmen engaged in excavating in the cellar of an old house. Upon opening the box the men found that it contained a large parchment and a quantity of pieces of iron of odd shapes. Being unable to make out the contents of the parchment, they carried it to Mr. Rizeff, the nearest magistrate, who found that it was written by Father Suger, one time minister to Louis VII, of France. It was an elaborately written treatise upon the use of steam as a motive power, and further examination revealed that the bits of iron were numbered parts of a rudimental but complete steam engine. It is proposed to fit the parts together and to exhibit this pioneer steam engine at the Columbian Exposition.

According to *l'Industrie Electrique*, a Havre jeweler, who has an alternate current transformer installed in the basement underneath his shop, has placed an iron grating over it, and in this way warms his premises largely at the central station company's expense.

"We do not think it indiscreet," says *La Lumière Electrique*, "to inform our readers that there is much talk at the Académie des Sciences of nominating Lord Kelvin (Sir William Thomson) as successor to the late Emperor of Brazil as one of the eight foreign associates. * * * It would certainly seem desirable that the Académie des Sciences should take this opportunity of adding an honor to that which the English government has just rendered to the illustrious electrician which the Royal Society of London has honored with its presidency."

A doctor who has just started in the West End has been advised by his younger brother, who is an electrician, to have an electric bell fitted in the hall and connected with his table.

One *ting* is an intimation to the servant in the hall to say to the patient, before he opens the street door, "The doctor's fee is £1 1*s.* sir." Two *tings* would mean £2 2*s.*, etc.

The idea is that the forgetful (?) patient, thus brought to book, will, in 99 cases out of 100, pay up and look pleasant, thus avoiding much heart burning.—*London Lightning.*

Young Men Electrifying the World.

Mr. H. V. Ferguson, of this city, was first to call our attention to the extreme youth of the men who are at the head of and doing the work of the great electric light and motor companies in our large cities. On the occasion of a recent visit to the Chicago office of the Thomson-Houston Company, he found the gigantic interests of that great corporation practically in the hands of men in the twenties and thirties.

The splendid Decennial Number of the ELECTRICAL REVIEW gives fine portraits and biographical sketches of the officers and executive committee of the National Electric Light Association, and the portraits present a group of 13 gentlemen, 12 of whom are comparatively young men. C. R. Huntley, the president, is 38 years old. The secretary, George F. Porter, is 37 years old. E. F. Peck, committeeman, is 31 years old, etc.

All of which emphasizes the wisdom of that portion of the proverb, which reads, "Young men for action," and slightly leads to weaken that portion which says, "Old men for counsel."—*Cedar Rapids, Ia., Republican.*

Magnetic Separation in Flour Mills.

But few, compared with the whole number of flour millers, seem to place a fair appreciation upon the importance of the magnetic separator in magnetic separation, as there are various devices for the purpose, some of which may be called separators and others scarcely deserving the title. It will probably astonish any man who has never made the experiment to find the quantity of all kinds of bits of iron that a magnet will separate from the wheat in its passage from the cleaners to the rolls or burrs in an apparently perfectly clean condition. The naked eye cannot discover the iron, but the magnet finds it readily. A very common way of doing it is to arrange a number of horseshoe magnets in a movable section of the lid of the wheat spout leading from scourers to stockhopper in such a way that the stream of wheat will pass among or through them freely. The bits of iron that may be among it, and there are sure to be some, are quickly attracted and adhere to the magnets until loaded, when they are removed, cleaned off and replaced for service. There are also automatic machines made for the same purpose, which are still more useful.

The baneful effect of grinding iron with the wheat, while more or less injurious to rolls and burrs, is most severely felt in its action on the bolting silk, which is sure to be permanently injured to a greater or less extent every time bits of iron are admitted to the reels, and just as sure to be ruined if the practice is long continued.—*The Mechanical News.*

Villard Will Stay.

At the quarterly meeting of Edison General Electric Company, held April 1, President Villard consented to retain the office for the present. A quarterly dividend of two per cent. was declared.

UNITED STATES PATENT OFFICE.

How the Business of the Most Prosperous of the Government Departments is Carried On.

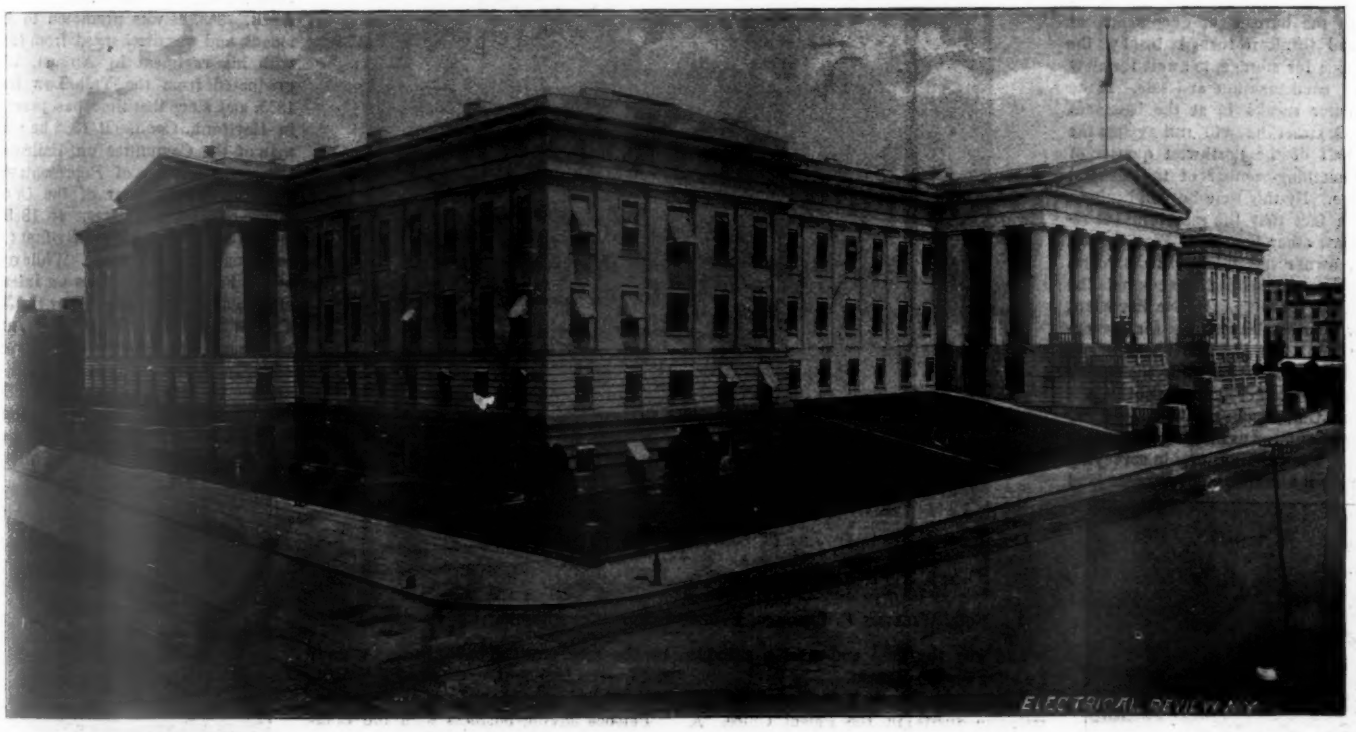
UNWELCOME GUESTS HAMPER PATENT OFFICE WORK.—WHY THE MILLS OF THE GODS GRIND SLOWLY.

BY GEO. C. MAYNARD.

I.

This imposing building, standing in the center of the capital city, is 275 feet wide by 400 feet in length and covers two entire squares. It is a modern Parthenon, with the flag of freedom floating above it, dignified and serene; a thing of beauty to every passer by, a whited sepulchre, full of inconsistencies and unclean things!

"Why does not the government give prompt attention to the business of its inventors?" This has long been the persistent interrogation and it increases in emphasis as the years go by. A person seeking answer to this inquiry will get much interesting information on this subject by a visit to the department. If he climbs the granite stairway leading to the main entrance on F street and passes into the stately vestibule, expecting to find the Patent Office, he will be disappointed. The graceful, groined arches are liberally decorated with silver stars, and spread eagles with agricultural products in their beaks, and a colossal map, belonging to the land office, prominently displays large areas of wild lands and Indian reservations. Down the corridor to the right, tightly closed doors to a long row of rooms bear signs indicating that they are sacred to the uses of the department of justice, and, at the end of the passage, a



THE UNITED STATES PATENT OFFICE AT WASHINGTON, D. C.

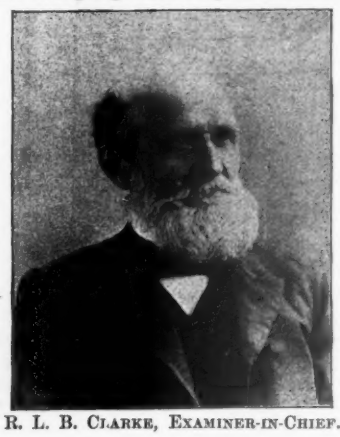
group of polite messengers guard the entrance to the spacious quarters of the Secretary of the Interior and his assistants. At the end of the passage to the left similar apartments are occupied by the Commissioner of the Land Office and his staff. In other rooms along the way, occupied by this bureau, the sunlight falls on beautiful oriental screens and rare vases filled with choice flowers, and an air of refinement and quiet elegance pervades the place. A few years ago the Patent

N. L. Frothingham, Assistant Commissioner of Patents.

Office had possession of all the rooms on this southern front, but they have been relegated to less desirable parts of the building.

If one enters by the Ninth street hall, the Land Office is above, before and on either side of him. At the Seventh street front the Pension Office greets him. If he tries the lower doors at the corner of Seventh and G streets, he will be very likely to find them blockaded with loads of books belonging to the bureau of documents, or second-hand furniture, turned in by the Census Office for storage, to await the slow process of condemnation and sale. If the tired inventor sneaks in at the basement door on G street, he will run against the southern half of the northwest quarter of section something-or-other of the general Land Office. By this time he will begin to realize the fact that the establishment resembles some other houses in Washington, which the owner has filled with boarders, while she sleeps in the kitchen and sends the children into the attic. In one important particular the resemblance fails, for the enterprising landlady makes her boarders pay for their accommodations, while the guests of the Patent Office get theirs for nothing.

The Land Office is one of the largest and most important bureaus of the government. It does an immense business in surveying and selling large tracts of government land



R. L. B. Clarke, Examiner-in-Chief.

to residents, actual and otherwise, beyond the Mississippi. It needs larger quarters than it now has, but why it should force the Patent Office out of its own house is a conundrum which practical business men find hard to answer. The officials of the Land Office say it brings a yearly profit of some millions to the government, but to reach that result they take credit for the total amount of sales of public lands. If this unique system of bookkeeping was applied to the business of the Patent Office it should take credit for the price of every patent sold by inventors.

The Bureau of Documents has 12 large rooms packed and piled with books and papers published by order of Congress. Tons and tons of the stuff is of no practical value to anybody, and much of it is packed in boxes which have not been opened for 15 years. The function of the Bureau is to secure the judicious distribution of useful documents to libraries throughout the country, and its work is very beneficial. Its premises are crowded to their utmost capacity. There is no more reason for keeping this establishment in the Patent Office than there would be for placing in the building a section of the Government insane asylum, another bureau of the Interior Department. There is no risk that this will ever happen, for all christendom would protest against keeping pauper lunatics in many of the rooms where patent examiners do their work. The public documents are issued from the government printing office, which is located near the railroad, carted a mile through the city to the Patent Office, stored an indefinite period and then transported back to the railroad. The cost of all this unnecessary labor would buy the land and erect a suitable building for the Bureau.

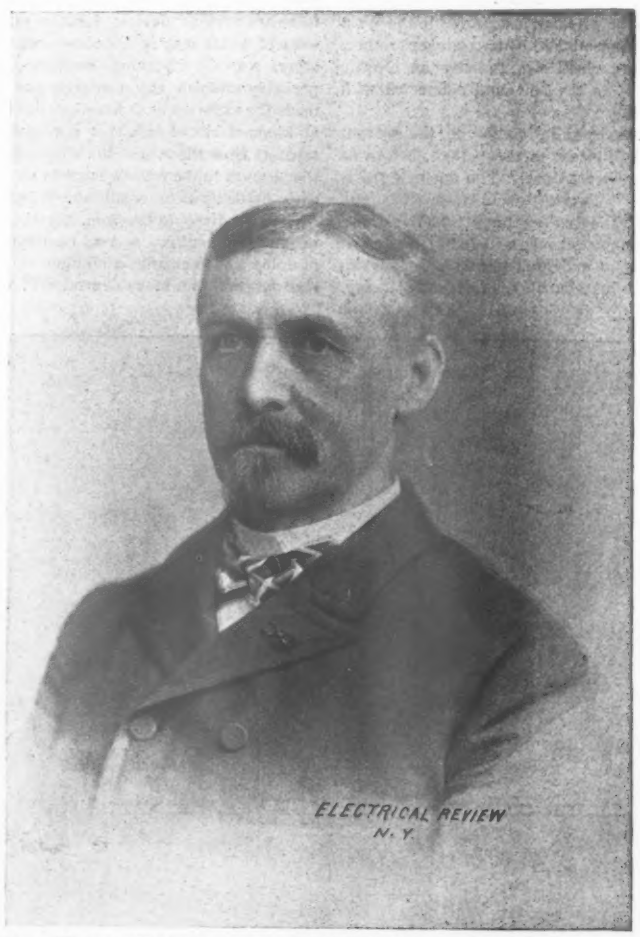
The Census Bureau is another of the unwelcome guests in the Patent Office. A large room, nearly 100 feet long, belonging to the model hall, is used for storing "returns" of some sort. This was, for a short time, one of the numerous camping places of the famous Electrical Division of the Census Bureau on its way to a costly fiasco, barren of useful results.

Considering the number and extent of offices which the building was never intended for, now quartered there, it might be doubted whether its rightful occupant has any part in it. But the Patent Office *is* still there; in the focus of the world's genius and enterprise; in touch with advancing civilization; alert, active, efficient—the most thoroughly live department of the United States Government.

The entire building contains 252 rooms, and the Patent Office has the use of 106 of them, including store rooms, coal vaults, etc. The illustrations of this article, most of which are from photographic views taken in business hours and without notice to the employés, give correct representations of the manner in which the business is carried on. They show the rooms exactly as they are when the examiners are engaged in their regular duties. In several instances part of the regular force of the divisions was out of the room, and there is a notable absence of attorneys and inventors who are usually present in considerable numbers. The sketches were made by artists of special skill and are true to life. These illustrations disclose, more forcibly than any statistics or arguments could do, a condition of things which, in some degree, accounts for the vexatious and damaging delays from which inventors and others are suffering.

Before getting into the disorder and confusion which are inevitable, it will be well to note the only place in the office that is never crowded—the section under the charge of Frank D. Sloat, the financial clerk. For many years Mr. D. P. Cowl, the registration clerk, has always been ready to receive the inventor's applications, and the financial clerk never hesitates to take his money—in advance. His office would soon be the most crowded in the Bureau were it not for the fact that, once every fortnight, it is emptied into the vaults of the treasury.

Persons having business with the Commissioner of Patents will not be so fortunate in the matter of conveniences for the prompt transaction of their business. That official has a roomy, well-arranged office, but, as it must serve for consultations with inventors, attorneys, subordinate officers of the bureau, Senators and Representatives, besides scores of importunate seekers for appointments to imaginary positions, and also as the court room where most important cases are heard, it is very apparent that the business is done with many interruptions and at great disadvantage. Callers waiting their turn for an interview must stand in the hall or sit behind a book-case, in a corner with the wood box, piles of mailbags and the janitor's tools, for company. The commissioner has a private room, not quite so spacious as a good bathroom, while directly under it is a corner room, lighted by three large windows and warmed by a cheerful, open fire, the principal use of which appears to be to hold an Ashcroft gauge used to indicate the varying pressure of the Potomac water supply. The present commissioner, William Edgar Simonds, is one of those peculiar gentlemen whose interest and enthusiasm in a good cause sometimes induce them to do an extraordinary amount of work for the government for a small fraction of the pay they could easily get in the practice of their professions.



Hon. William E. Simonds, United States Commissioner of Patents.

He was born at Collinsville, Conn., November 24, 1843. He was educated at the common and high schools of that village and also at the Connecticut State Normal School. He taught school for a year or two. In August, 1862, he enlisted as a private in the Twenty-fifth Connecticut Infantry, his brother and step-father, the only other male members of the family, having already enlisted for three years. He was soon made sergeant-major of the regiment, and at the battle of Irish Bend, in Louisiana, on the 14th day of April, 1863, he was promoted to be a lieutenant, and was discharged from the service with his regiment in August, 1863. He graduated from the Yale Law School in 1865, and since that time has practiced law in Hartford, Conn. It 1883 he was chairman of the Committee on Railroads in the Connecticut House of Representatives. In 1885 he was Speaker of the Connecticut House of Representatives. In 1888 he was elected a member of the Fifty-first Congress, in which body he served. While a member of the Fifty-first Congress an international copyright bill was reported by the Judiciary Committee, debated for two days, and failed of passage by a negative majority of about 40. Mr. Simonds then redrafted the bill, adding its famous thirteenth section, and procured its favorable report to the House. On the third day of the short term he secured its passage through the House, after a vigorous fight, by a majority of about 40. By reason of parliamentary tactics and manœuvres it had to pass the House, in one shape or another, three times subsequently, each time after a fight over it, the last passage being about two o'clock on the morning of March 4, 1891, the day on which Congress adjourned. For this service in connection with international copyright the government of France conferred upon him the Cross of the Legion of Honor. He has filled the lectureship on patent law in the Yale Law School since 1884. Yale University gave him an honorary degree at the 1890

G. W. Stocking, Examiner-in-Chief.

H. H. Bates, Examiner-in-Chief.

Commencement. He is the author of a Digest of Patent Causes, a Digest of Patent Office Decisions, a work on Design Patents, and a small work known as a Summary of Patent Law. His commission as Commissioner of Patents dates July 1, 1891, and he entered on the performance of the duties connected with the position on August 1, 1891.

The assistant commissioner, Mr. N. L. Frothingham, who served as the law clerk for four years and who was formerly a prominent attorney in Boston, with the present law clerks, William S. Case and Wesley G. Carr, are located near the commissioner, while the chief clerk, with his force of employés, is a square away, and the board of examiners-in-chief has been moved to temporary quarters in the model room. The accommodations of these officials are respectable and fairly convenient.

PATENT SPECIFICATIONS IN THE CELLAR OF THE PATENT OFFICE.

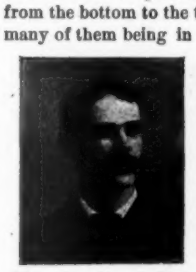
JUDGE JOHNSON, EXAMINER OF INTERFERENCES, U. S. PATENT OFFICE.

As much cannot be said of the court of justice presided over by Walter Johnson, the examiner of interferences, before which such vast interests are adjudicated and such array of legal lore is brought out. This more nearly resembles the office of a country justice of the peace. It is in a narrow strip cut off from one of the original rooms by a slight board partition, reaching part way to the ceiling, and is 15 feet wide by 20 feet long. A railing cuts off about half of the room for the use of the judge, with his desks, tables, file cases, etc., and leaves a space 8x12 for counsel and other persons interested in pending cases. At times it is difficult for these parties to get inside the room. Judge Johnson consented to sit before the REVIEW's camera, after prudently turning the labels on his file-cases to the wall. In a great many cases it is necessary to bring exhibits before the court, and, as these exhibits range in size anywhere from a push button to a 40-light dynamo, it frequently happens that Mahomet goes down into the cellar and takes the court with him. In the subbasement of the building, adjacent to the coal vaults, is a dark room, under the care of keen-eyed, muscular watchmen, in which exhibits are kept while interference cases are pending. The collection looks like a dozen wagon loads of old junk, but the fate of fortunes depends on its being safely kept and thoroughly understood by Mr. Johnson. When he wishes to study one of the machines he shuts himself in the dungeon with an incandescent lamp; when it becomes necessary to produce any of the larger ones before the court, they are dragged out into the hall, and judge, counsel and audience go down to examine them.

One of the things most exasperating to persons having business with the office is the occasional delay in getting certified copies of patents, abstracts of title and other official information furnished by the assignment division, which are often needed for use in lawsuits and other important matters. Eighty-two efficient, industrious clerks are employed to do the work under the supervision of Thomas W. Lord, and the view of their room explains how they do it. They are huddled into a corner of the unfortunate model room under a canvas ceiling eight feet high, around a large stove which roasts one half the force and leaves the other half cold. Ten typewriters in the center of the group make the most distracting racket. Twice every day self-preservation compels the clerks to evacuate their quarters while the windows are opened for ventilation. Meanwhile courts and corporations wait and wonder.

The draughtsman's division, now under the supervision of Joseph B. Marvin, has gone through all the processes of addition, subtraction, multiplication and division, until it has become an establishment difficult to locate and impossible to describe. It is one in which the public generally has a special interest. Many persons who never take out patents themselves carefully watch the development in the arts to which their business is allied and always get copies of the new patents as soon after they are issued as possible. Last week over 30,000 copies were sold. All orders for these copies are received by Alex. H. Scott, the assistant draughtsman, who has held the position for 21 years. He is an accomplished draughtsman and a walking encyclopedia on all questions relating to the affairs of the office. Fifteen clerks are employed in his room. A large number of persons have regular accounts with this office, to the credit of whom there are various deposits, ranging from $1 to $100. Some of these customers have standing orders for from 5 to 20 copies of every patent in certain classes issued by the department. Electrical patents are most in demand. Carpet designs, sewing machines and harvesters come next in the order given. Inventors frequently take as many as 50 copies of their patent as soon as it is issued. Up to last July 150 copies of each patent were printed. At that time the number was reduced to 100 for want of room to file more. The average cost of these patent specifications is three cents, and for every one sold the government gets 10 cents. These figures seem to indicate that, after adding 33⅓ per cent. for handling, there remains a profit of 200 per cent., but at these rates, which a private publisher would consider reasonably remunerative, the government fails to supply the demand with promptness and, a few weeks ago, was compelled to suspend the sale entirely, because, after the weeks' issue was received from the printing office, there was no place where they could be assorted and distributed. The emergency was tided over by spreading the documents out on the floor of one of the basement halls, but the relief was only temporary and is liable to occur again at any time.

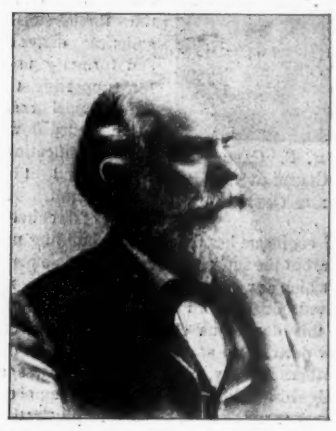
The files of specifications are scattered from the bottom to the top of the building, many of them being in very unsuitable and inaccessible places. Nearly one-quarter of the model room is filled with them, the three storied galleries designed and formerly used for supporting the light model cases being loaded down with specifications far beyond the safety limit. A board of architects and engineers has reported the building unsafe, but the superintendent can find no place to which any part of the papers can be removed. Instead of relieving the model halls of this dangerous element, workmen are now putting up specification shelves in the southern gallery, blocking up the passages designed for the use of persons having occasion to examine the models. The illustration showing the carpenters engaged in this work also shows model cases standing in the center of the passage on the lower floor, to which they were removed to make room for the Census Office. The view of the specification files in the basement correctly shows the kind of work going on there, but leaves out some interesting surroundings. Rows of pine shelving, built to the ceiling, fill the corridors leaving a passage five feet wide in the center and three feet six inches between double rows of cases on either side. These narrow lanes are nearly 300 feet long, lighted only by an occasional incandescent lamp and the candles which the employés are often obliged to carry to distinguish the numbers. Through these narrow passages 50 tons of coal is transported in wheelbarrows every month, and the ashes from the furnaces are wheeled a distance of 400 feet. The firemen complain that the pulling of the specifications out of the shelves keeps the place so full of dust and ashes as to nearly suffocate them, and have rigged up an ingenious fan to blow the ashes back into the files. This will account for the soiled condition of



WM. S. CASE, LAW CLERK OF THE PATENT OFFICE.

THE DRAUGHTSMAN'S DIVISION, U. S. PATENT OFFICE.—ATTORNEYS EXAMINING THE FILES OF DRAWINGS.

some of the patents sold to the public. The draughtsman's division is supposed to have a complete file of the drawings of patents always readily accessible to the public, and arranged for convenient examination. The view of the room in which such examinations are made, sketched by a skillful artist, shows exactly what conveniences the public have. The room is constantly crowded. The lucky men get milking stools to sit upon, others stand in the corners and aisles. The lack of air and light, and the general discomfort and unwholesomeness of the place, have appropriately given it the name of "the black hole of Calcutta." A small part of the drawings are



GEO. D. SEELY, PRINCIPAL EXAMINER, GENERATION AND DISTRIBUTION OF ELECTRICITY, ETC.

kept in the room, many of them being in the halls of the building subject to improper handling by unauthorized persons. Some years ago all these records were kept in closely guarded rooms; now the only thing that stands between some of the secret archives of the office and publicity is the integrity of visitors to the building. And while the government's economical *regime* continues no Commissioner of Patents can prevent unscrupulous persons from getting information not intended for the public.

Every application filed in the office is promptly registered and forwarded to the examiner having charge of the subject to which it relates. Everything pertaining to

provided by the government for the transaction of the business would be commensurate with the interests involved.

"Interviews from 11 to 12" is the legend on the door of room No. 87. An interesting prospect greets the interviewer who opens that door. A barricade of desks in front, a busy typewriter to the left, a copyist to the right, Chief Examiner Seely over in a back corner, six assistant examiners wedged into small spaces here and there, and no passage anywhere. By stopping the work of half the people in the room, closing

F. A. SEELY'S DIVISION OF THE PATENT OFFICE.

several portfolios of drawings and crowding the occupants of the seats as closely under their desks as possible, a tortuous passage, two feet wide, is opened by which the attorney, whose client is probably paying him $50 a day, manages to reach the examiner having his case in charge. The room measures 21 feet 6 inches by 22 feet 10 inches, and that is all there is of Division 26. There are often three or four attorneys in the room

ELECTRICAL DIVISION OF THE PATENT OFFICE—EXAMINER GEO. D. SEELY'S ROOM.

electric railways, locomotives, motors of every description, dynamos, batteries, conductors, conduits, car brakes and heaters, medical appliances and a miscellaneous lot of other electrical inventions, including lightning rods, go to Division No. 26, of which George D. Seely is the principal examiner. As these classes represent the numerous and important inventions utilized by such companies as the Edison, Thomson-Houston, Westinghouse and Brush companies, and a host of others, it might reasonably be expected that the facilities at the same time, and the exigencies of the situation require that the attorney of one inventor may overhear the affairs of another. For the accommodation of visitors there is one chair in Mr. Seely's corner and an extra stool, usually kept on the top of one of the cases. All the desks are piled with papers and books, and the wall space is occupied by cases reaching nearly to the ceiling. For lack of a wardrobe, or space for it, hats, coats, bonnets and other articles of wearing apparel are hung indiscriminately around the room. A ragged

could be shown, but that question belongs to the philanthropists—and the House of Representatives. The rights of inventors is the burden of this article, and it is fair to assume that after they have paid in advance for having their applications passed upon, they are justly entitled to the services of examiners who are not hampered by such conditions as these. Under existing circumstances it is impossible for the force in Seely's division to do justice to the work assigned them—and his is not the worst division in the office. A careful consideration of this point will inevitably lead to the conclusion that, with ordinary facilities, such as any practical and economical business man would give his workmen, the present force of Patent Office examiners could easily do 25 per cent. more work.

Division 16 which passes upon all applications relating to telegraphy, telephony, electric lighting and electric signaling, with all the multiplicity of sub-classes and details

comprised in these subjects, is another of the most important divisions in the office, and it has its full share of inconveniences. It has seven examiners in one room, and the principal examiner, Gustav Bissing, and three clerks occupy a very small adjoining room. The REVIEW is indebted for its most perfect illustrations of the arrangement of these rooms and the manner in which the work is done to Mr. Clement, one of the assistant examiners who made most admirable sketches for the purpose. Description can hardly add anything to the striking portrayal of the obstacles to the proper transaction of business in this place. In addition to the usual business of this office, there are many calls from interested parties, who have occasion to examine files of foreign drawings, which cannot be found elsewhere. It frequently happens that an examiner is obliged to leave his desk, in order that drawers of records behind his chair can be opened. Anything like private consultations between the principal examiner and his assistants, or with inventors and their attorneys, is impossible. Interruptions are incessant and the wonder is that so much is accomplished. In Mr. Seely's division, 321 applications,

GUSTAV BISSING, PRINCIPAL EXAMINER, TELEGRAPHY, TELEPHONY, ELECTRIC LIGHTING, ETC.

some of which have been on file since the middle of last November, have not been touched. Mr. Bissing has 236 awaiting attention, but none of them are more than three months behind.

The various classes of applications for patents relating to electrical matters are examined by the following named officials:

Electric railways, telpherage, by H. L. Morton, M. E., graduate of the Ohio State University.

Continuous current motors, systems of distribution, etc., Miss S. J. Noyes, who was the first lady appointed as second assistant examiner, and who has seen the longest service in the electrical division.

Magneto-electric machines, galvanometers, meters, etc., A. P. Shaw, of Lehigh University.

Batteries, etc., H. B. Brownell, of Yale College.

Alternating current motors, transmission of power, etc., W. M. Fairfax.

Conductors, conduits, etc., Harold S. MacKaye, C. E., Columbia School of Mines.

Telegraphy, F. M. Ward, M. D., of Georgetown University.

Electric lighting and telephones, W. A. Cowles, C. E., Yale College.

Telephone systems, Nicholas M. Goodlett, Jr., A. B., L. L. B., Yale and Columbian University.

Railroad and municipal signals, D. H. Decker, Ph. B., L. L. B., Cornell and National University.

Electrical metal working, G. C. Dean, A. B., L. L. B., Amherst and Harvard.

Safety systems and switches, G. C. Wedderburn, Jr., Georgetown University.

Municipal signals, lamp sockets, etc., E. E. Clement, U. S. Naval Academy and National University.

The principal examiners of the respective divisions are Gustav Bissing, Ph. D., of Johns Hopkins University, and George D. Seely, who graduated from Yale College in 1859.

(To be Continued.)

Progress in Creede.

The new mining town of Creede, Colo., is already lighted by electricity from a plant which was in operation within five days of the ground being taken for building. Although but one block apart, the express office is Creede, the post office, Amethyst, and the Western Union Telegraph Office, Jimtown.

Important Storage Battery Decision.

A decision which promises to very materially affect the future of electric traction, as operated by the storage battery system, was handed down April 9, by Judge Coxe, in the United States Circuit Court. The decision settles the long contested suit brought by the Accumulator Company, of Philadelphia, against the New York and Harlem Railroad Company, to restrain them from using the Swan perforated cells, the use of which the Accumulator Company claim as their sole right under the Swan patents, and in which Judge Coxe, by his recent decision, has fully sustained them. The New York and Harlem Railroad Company were defended by the Consolidated Electric Storage Company, who are the licensees of the Brush Electric Company's storage battery patents.

Siemens and Halske at The World's Fair.

The London correspondent of the New York *Sun* cables his paper that Arnold Siemens, of Siemens and Halske, has returned from his trip to America to arrange for the firm's exhibit at the World's Fair. According to the *National Zeitung* the American electricians, including the Edison, Westinghouse and Thomson-Houston companies, combined to thwart the wishes of Siemens as to the selection and extent of the space for his electric lighting exhibition. Consequently, the *National Zeitung* says, the firm will make only a comparatively small showing. The firm has made all of its arrangements, however, to establish simultaneously in Chicago a large factory for the making of articles on which the patents will not expire for the next seventeen years. The contracts for the ground and materials have been concluded, and work will be started so that the factory will be in operation during the Fair.

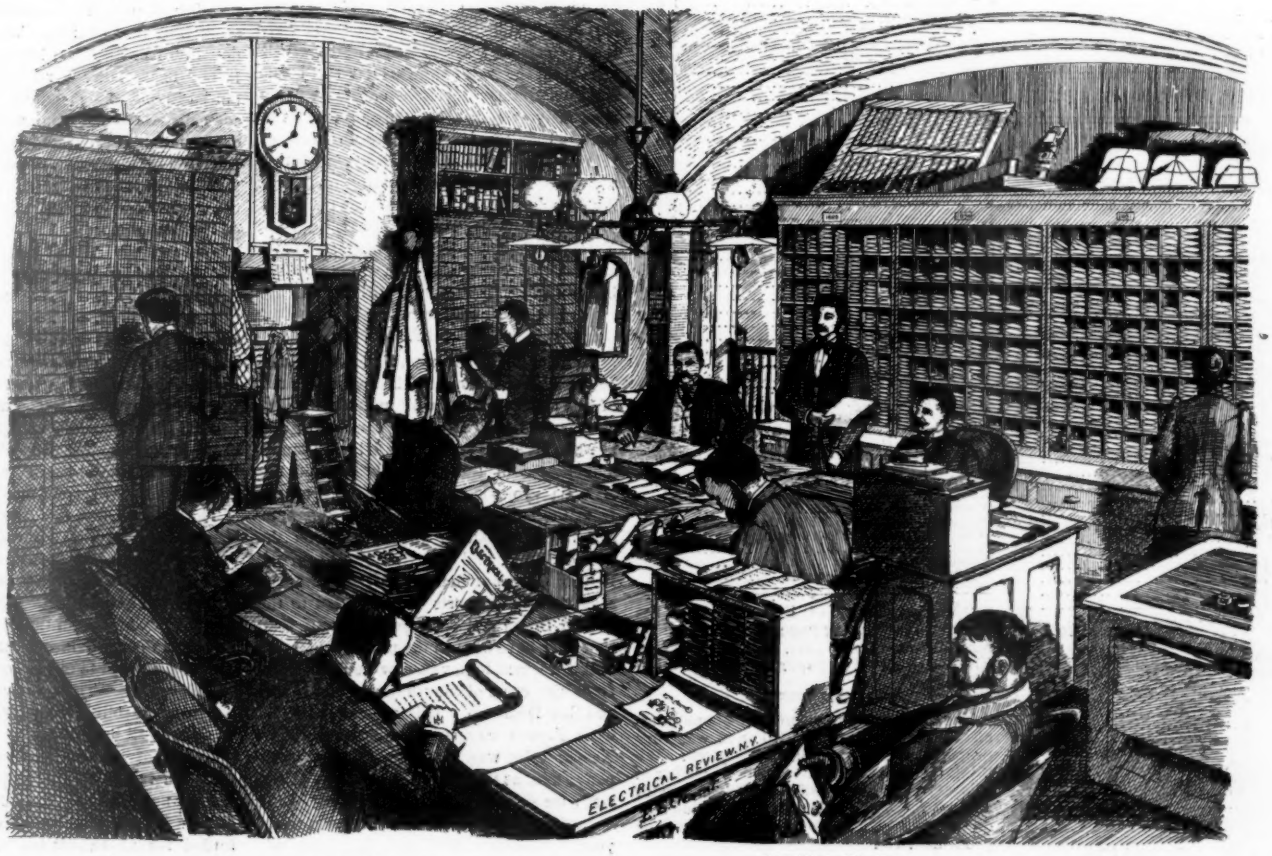
Governor Abbett Deals a Blow at the Trolley Roads.

As we go to press news is received from Trenton, N. J., that Governor Abbett has refused to sign Assembly bill 192. This is the electric railroad bill, and was intended to nullify the decision in the Supreme Court in the suit brought by Geo. A. Halsey and others to prevent the construction of electric roads in Newark and Trenton. His refusal puts the operators of trolley roads in Newark, Passaic, Paterson, Camden and other places in New Jersey, in the light of trespassers. Many people in Newark look upon the electric roads as the only solution of the rapid transit problem. They are surprised at the Governor's action in view of the fact that James Smith, Jr., Gottfried Krueger, the officers of the Prudential Insurance Company, and many other influential men in politics on both sides, are deeply interested in electric road projects, and roads are being laid or projected between Newark and Jersey City, Elizabeth and Newark, Newark and Passaic, and many other cities and villages.

The Pennsylvania Railroad Company is interested in the road now building between Jersey City and Newark, and it is to be joined to the Elizabeth and Newark road. Millions of dollars have been invested in the new system by local capitalists in the proposed roads, and the strongest influence has been brought to bear upon the Governor without effect.

Mr. Halsey's suit was brought to prevent the Newark company running an electric line along Broad street in front of his house. Horse cars are now run on this route. The report of the Governor's action created a sensation throughout the city of Newark, and paralyzed the prospects of the investors in electric roads. There is a chance of an appeal to the Court of Errors.

THE ELECTRICAL DIVISION OF THE PATENT OFFICE.—EXAMINER BISSING'S ROOM.



EXAMINER BISSING'S DIVISION OF THE U. S. PATENT OFFICE.—TELEPHONY, TELEGRAPHY, ELECTRIC LIGHTING, ETC.

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"Modern Views of Electricity" is the title of an interesting paper recently read by Mr. William Stanley, Jr., before the Boston Electric Club. The paper appears in full in this issue.

The Malone bill to reduce telephone rentals in New York and Brooklyn was very properly killed at Albany last week. We think the thoughtful telephone subscriber in this city is amply satisfied with both service and rates. This bill did not provide adequate remedy, any way. Politics were too prominent in it.

Now that the trolley system has come to be an assured fact in Philadelphia, a philanthropic citizen of that town has come to the front with the proposition that, if the company desire to ascertain exactly how many volts of electricity can be fired into unsuspecting passengers without doing more than knocking them into speechless imbecility, he is prepared, for a suitable consideration, to loan them his estimable and loquacious mother-in-law to experiment on. Where would the needs of science and the safety of the public meet with such personal sacrifices but in the city of brotherly love?

In the death of A. B. Uline, of Albany, chronicled elsewhere, the telephone fraternity has lost one of its ablest members, and the State an admirable and progressive citizen. The REVIEW deeply sympathizes with his afflicted family, and, with his countless other friends, feels a sense of personal loss in the sad and sudden departure of this vigorous man who died in the prime of life.

The Review of Reviews, "the busy man's magazine," has paid the ELECTRICAL REVIEW an appreciated compliment by reviewing our Decennial Number at considerable length in its April issue. The point of the compliment is that this is the first instance in which a weekly publication has been reviewed by our valuable contemporary. The abstract is carefully and intelligently prepared, as is the case with all the matter appearing in *The Review of Reviews*.

The bill incorporating the General Electric Company of America has been passed by the New York legislature. The bill, however, has been amended so that the broad privileges originally asked for have been somewhat abrogated. The operations of the new company are confined to the manufacture of electrical apparatus and furnishing electrical plants. The passage of this bill is an important step in the organization of the Edison-Thomson-Houston combine, and we may now look for the ultimate conclusion of this gigantic deal.

The Electric Club of New York is in financial straits owing to the lack of support afforded by the members. That this state of affairs should exist is a disgrace to the electrical interests represented in New York city. This statement is proven by the fact that the bulk of the money with which the club has been run during the past year has come from the board of managers and the out-of-town members. Resident members have neglected the club sadly. If the present organization decides to wind up its affairs, we sincerely hope that a Phœnix will arise from the ruins from which the indifferent and unappreciative element will be rigorously excluded. If the club decides to continue its existence, strong measures of reform should be instituted by which this same element may be effectually squelched. An electric club composed of the right sort of men has a place and a mission in New York city. The electrical interests in and around this city demand a representative body of this character, and will have it.

OUR CABLES.

The increase in the number of cable lines between this country and the various islands of the West Indies will undoubtedly encourage the growth of our commerce, and must be highly advantageous to those islands. The people of the several islands of the Bahama group are already enjoying benefit from the cable that was laid a few months ago from Nassau to Jupiter Inlet on the Florida coast, and Sir Ambrose Shea, the British Governor-General of the Bahamas, says that the exports from Nassau to the United States will be larger this year than they ever have been in the past.

We are next to have a new cable running from the coast of South Carolina to Cuba and San Domingo. This cable is to be laid by a French company, while the Jupiter-Nassau cable was laid by an English company; and, as the French company's line is ready for submergence, it will probably be in operation before the close of the present year.

Within a few years we will doubtless be in telegraphic communication with all the more important of the hundreds of tropical islands that are known as the West Indies, and that run from near our own Atlantic seaboard to the upper part of South America. The civilizing influences of the American republic will yet be felt in all these islands, remarks the New York *Sun*, and the commerce between them and this country will yet surely attain proportions that cannot now be measured.

A GLIMPSE OF THE PATENT OFFICE.

The ELECTRICAL REVIEW has repeatedly called attention to the shameful lack of conveniences afforded for the transaction of business in the United States Patent Office. The attention of Congress has been so often called to the subject by the urgent appeals of every Commissioner of Patents for the past ten years, that there is no other excuse for its outrageous failure to provide proper facilities than the apathy of the members of Congress to the needs of the American inventor. The large-brained founders of this republic provided liberally for the development of science and the useful arts, by framing a model system of patent laws, which has nursed into strength an ingenuity which has been the admiration and envy of the world. The leaven added by a single clause of the constitution has permeated all civilization, and more than any other factor has contributed to our position as the leading people of the world. The old statesmen, whose keen foresight of the requirements of national progress offered a strong stimulus to inventors, have degenerated into a race of narrow politicians who pare appropriations for needed public improvements and dump the parings into vote-capturing enterprises.

It is the hope of the REVIEW that if the real situation of things can be brought to the attention of the people at large, such pressure will be brought to bear as will wring from Congress a proper recognition of the inventor's rights. At present his government is using him "for revenue only," and salts away the millions of dollars ground out of him in the cellar of the United States Treasury.

The REVIEW is going to give to its readers the condition of things as they are at the Patent Office. It presents in this issue a graphical representation of the situation, which speaks in no uncertain tone. Let the inventor make the most of it by impressing it upon the gentleman who represents him in Congress. The story told is not overdrawn—it faithfully mirrors the facts. It is, indeed, remarkable that the office can be so well administered with the conveniences at its command. It is only a confirmation of the traditional Yankee characteristic of triumphing over difficulties. The *personnel* of the bureau is of a very superior character, and work is accomplished in spite of the environment.

It has for years been the custom at the Patent Office to officer its examining corps by rigid competitive scientific examinations, and none but such as are scientifically trained can take a successful standing. This rule governs in promotion as well as admission. There have been a few exceptions where commissioners have listened to the dictates of politicians, or through personal friendship have opened a back-door to candidates of mediocre qualifications, but they are not many.

The Patent Office is a hive of industry—there are no sinecures. The gentlemen who look at you from the pages of the REVIEW are kept in intimate touch with every changing phase of industrial effort. It is their function to sift the wheat from the chaff in inventive ideas and their province to explore the literature of the world to expose one rejuvenated or reinvented. Their duty is well done, but if the disabilities noted were removed it would be still better done.

A patent should be an almost certain guaranty of novelty—that it is not is no fault of the examining corps—there is not half the necessary time afforded for an exhaustive examination of an invention. The corps should be largely increased in number, and the whole of the noble building erected by inventors' contributions should be given up to its uses. Let the land office and the census documents and the general interior department and the other numerous interlopers be ousted and the inventor be given a chance. His brains have made us what we are; we have abundant reason to regard him with admiration and pride—let the spirit of 1776 be emulated in giving him a show.

CORRESPONDENCE.

OUR SEATTLE LETTER.

G. M. Angier, well known in Chicago electrical circles, left on Saturday of last week to accept a responsible position in the home office of the Mather Electric Company, of Manchester, Conn. Mr. Angier was formerly with the Northwest Thomson-Houston Company, of St. Paul, and lately has been assistant manager of the Knapp Electrical Works, Chicago.

Two Cars in One.—A large number of street railway men and other interested parties visited the works of G. H. Hollingsworth, at Beaver Brook, Waltham, Mass., Monday, March 28, and examined the new combination car just finished there. The car is built under patents owned by the Combination Car Company, organized under the laws of Maine. The car in question is designed to be used both as an open and a closed car, and can be readily changed from one to the other.

The Sunset Telegraph and Telephone Company will begin work in April on the construction of a through line to Portland. The line between this city and Tacoma will be rebuilt and an extension will be built from Tacoma. It will have three wires and will form a circuit, to which all the towns along the way will be looped. When completed this line will render it possible to carry on conversation from Seattle to Portland, a distance of 188 miles. The company has completed a line from Snohomish to Everett.

Wendell Easten, a well known capitalist and leading real estate dealer of San Francisco, while recently in San Diego, gave the people of that city some sound advice regarding electric roads. In an interview with a reporter for the *Daily Union*, of that city, he says: "Local improvement should be encouraged. The construction of a first-class electric road is a grand thing for the town. Give the company all the privileges it asks for. Capitalists that will construct an expensive road of this kind you want to nurse. The electric system of street railways has been very popular, and will be a potential means of developing the suburbs." H. L.

Seattle, Wash., April 2.

OUR CHICAGO LETTER.

The Western Electric Company reports business on the increase, and their factory is being rushed to its full capacity in order to supply the demand for their goods.

The Electric Merchandise Company reports spring business opening-up remarkably strong, and within the last week has received some large contracts from the South and West for railway equipments.

The Central Electric Company are making a special run on their triple grade fire and weather-proof wire, and report many large orders of late for the same. They are also having a big demand for their Gladiator dry battery and the many orders received are evidence of the popularity of this battery.

Cutter's Conduit Connector is finding its way into more manholes every month and allows the different sections of the underground cables to be readily and thoroughly inspected. It has been used for many months on arc circuits in Chicago, where it is found to meet all the requirements of practice.

The World's Fair Grounds were visited Tuesday morning, April 5, by a cyclone, which did considerable damage. The Illinois State Building and the pumping station were the buildings which received the greatest shock. The greatest damage was confined to the Illinois State Building. The staging and the derrick surmounting it had been built up to a height of 137 feet in the center of the building, where the tower is to be located. The staging and the derrick were blown down, entirely removing about 65 feet of the upper portion of the tower. The pumping station, which was built of brick, had reached a height of 50 feet and was completely demolished. The Machinery Hall and the Mining Building suffered somewhat from the storm, but the damage done was slight. The total damage will amount to about $30,000, and preparations are now being made to rebuild the portion carried away by the storm. The Electricity Building, standing next to the Mining Building, suffered no effects whatever from the storm. M. J. B.

Chicago, April 9.

OUR SAN FRANCISCO LETTER.

Work is to commence at an early date upon an electric road in Vacaville, Cal.

The Contract for lighting Nevada City, Cal., by electricity has been let. The dynamos are to be run by water power.

The Trouble over the ownership of the 250 foot electric light tower in San Jose, Cal., is at an end. The San Jose *Mercury* has leased the aerial structure from the electric light and power company of that city, and for the first time in months light issues from the great tower.

Ground has been broken for the new belt line electric road at Fresno. The same route as that traversed by the present horse car line will be followed, but will be extended beyond Belmont, taking in Arlington Heights and the East Fresno depot of the San Joaquin Valley Railroad. The Thomson-Houston system will be used.

A Submarine Cable, to be used by the Sunset Telephone Company, arrived at the Oakland mole last week. This immense cable, weighing 70,000 pounds and containing 30 conductors, is to be laid across San Francisco bay, thus greatly improving the telephone service between San Francisco and Oakland, as well as interior towns.

A. A. Osborne, who has had charge of the Berkeley electric light plant for some time past, and who was the defendant in the recent suit brought by the Edison General Electric Company, of that city, has turned the plant over to other parties. Mr. Osborne undertook to run the plant at too low a figure, depending upon the patronage he would receive by doing private and commercial incandescent lighting. This patronage he failed to receive, and was obliged to take the action as above mentioned.

A Remarkable Operation was recently performed at the city and county hospital in San Francisco, during which the electric light played an important part. The patient was afflicted by an abscess which had formed in the pleural cavity and attacked the left lung. Two deep incisions were made in the left breast by the physicians and the flaps of flesh were thrown to one side, thus exposing the third rib to view. A miniature incandescent lamp was thrust into the thoracic cavity and every vestige of the pus removed. While the operation was in progress it was possible for those assembled to observe the heart and lungs in action. At the time of writing the patient is a changed man, being able to breathe freely. This he had been unable to do for months. J. R. K.

San Francisco, April 8.

OUR BOSTON LETTER.

New England Electric Club has leased the premises at No. 14 Bosworth street, this city.

Bath, Me., Street Railway Company will soon, it is said, equip four miles of its road with an overhead trolley system.

Messrs. Baldwin Brothers, bankers and brokers and dealers in electrical stocks and securities, have pleasant offices at No. 71 Devonshire street, this city.

Mr. W. E. Whitman, manager of the Whitman Agricultural Works, at Auburn, Maine, was in town the past week investigating the merits of various makes of electrical machinery.

Mr. Edwin R. Gilbert, manager New England office of the Eddy Electric Manufacturing Company, makers of the celebrated Eddy motor, has pleasant and commodious quarters at No. 30 Oliver street, this city.

Electric Lights for Hingham, Mass.—At the town meeting, held at the place named, recently, a committee of five was appointed to discuss the advisability of establishing an electric light plant to be owned and operated by the town.

Projected Electric Road.—It is reported that there is a projected electric railway enterprise on foot, work on which is to be commenced this month. It is said that the projected road will run between Boston and Stoneham, Mass.

The Erie Telephone Company's sub-companies increased their net earnings for January and February $7,700 over 1891. The net gain of subscribers for the two months was 109, and the total number connected March 1, was 14,120.

The Malden, Mass., Electric Light Company proposes, it is said, to build a large extension to its present central station at an early day, which will cost about $50,000, and when completed, electric power will be furnished in addition to the lighting service.

Manager Fred. Barnes, of the New England department of the Westinghouse Electric Company, reports the following recent installations: 2,000 lights (alternating) for the Abington Electric Light Company, Abington, Mass.; isolated plant of 500 lights (direct current) for Anthony Cowell & Company, Providence, R. I.; and additional electric equipment for the Gloucester (Mass.) street railroad. W. I. B.

Boston, April 9.

High Smoke Stacks.

TO THE EDITOR OF ELECTRICAL REVIEW:

Sir—Your San Francisco, Cal., correspondent, "J. R. K.," tells us that the Edison Light & Power Company, of that city, are going to have the largest stack or chimney in the world, being 28 feet base and 128 feet high. He is largely misinformed as to large or high stacks.

The Calumet & Hecla Mining Company, Calumet, Mich., have three stacks which are 40 feet foundation and 252 feet from the top of the earth. He will have to do better than that or close up shop on high stacks.

Yours respectfully,

ED. F. INDERMILL.

Electric Dept. C. & H. Mining Co.,
April 7, 1892.

Death of A. B. Uline.

A DESCRIPTION OF THE LIFE WORK OF THIS PROMINENT TELEPHONE MAN.

Andrew B. Uline, vice-president and general manager of the Hudson River Telephone Company, died suddenly and most unexpectedly April 4, at Nassau, New Providence, one of the Bahamas. The first news of the sad event was received at Albany, N. Y., Mr. Uline's home, April 5, by long distance telephone, and was afterward confirmed by cablegram.

On March 10, Mr. Uline, in company with Vice-President and General Manager W. D. Sargent, of the New York and New Jersey Telephone Company, left for an extended tour. On the day of his death a letter was received by an Albany relative, stating that he was in excellent health and expected to sail from Nassau for Florida soon. Mr. Uline was taken ill as he was going to his room in the hotel Monday evening, April 4, and expired almost immediately from heart disease.

Andrew B. Uline will be missed by friends from New York State to the Pacific Coast. His family as well as acquaintances were expecting an early return home. He had gone on the trip, not especially for his health, but for rest and recreation after a year of the greatest responsibility in his offices of the Hudson River Telephone Company. Mr. Uline was a man of public spirit and progress. He had a great mind for business, and possessed qualities which made friends everywhere. He was always upright in his dealings and had a strange yet effective personality. Andrew B. Uline was born in West Sand Lake, Rensselaer County, N. Y., July 17, 1836. His education was received at the district school in his native village and at Schram's academy. When 20 years of age he went to Indianapolis, at which place he remained three years as an employé of T. S. Smith & Company, in the capacity of confidential clerk and bookkeeper. While there he boarded with the Hon. John C. New. Subsequently he contracted the fever and ague and was obliged to come East for his health.

He had no friends or relatives in Albany, and the considerable portion of his father's property which had been left him he had given for disposal between the younger members of the family. His wish was to become connected with the railroads converging at Albany, but he had no friends through which to reach the managers of these corporations. His health became much better at Albany. But having lost 50 pounds through sickness, he did not appear very muscular or brawny when he applied at the office of the Merchants' Dispatch for a position. The agent informed him that they had all the men required in every department. But Mr. Uline exhibited then that indomitable perseverance which has characterized his whole life. He was so persistent in asking for something to do, that the agent exclaimed, in a perfunctory manner: "You may go to work at trucking freight in the platform at 50 cents a day."

Mr. Uline accepted the offer and in three years he was appointed the Albany agent of the Merchants' Dispatch. In 1863 he was advanced to the position of superintendent. In 1872 he accepted a more lucrative position as general eastern freight and passenger agent of the Detroit and Milwaukee Railroad. He held this position until 1878.

In that year his history becomes identified with telephony. He saw the future of the telephone, and with earnestness and commendable foresight, set about to organize a telephone company. He secured the encouragement and financial assistance in prosecuting this project of several representative Albanians.

Then the Commercial Telephone Company was organized, with A. B. Uline as general manager, and it was almost wholly to his good management and sound executive ability that the growth of the company continued in such a surprising manner. The name of the company was afterwards changed to the Hudson River Telephone Company. He took the telephone business in its infancy and made a great and necessary industry of it. The telephone company was incorporated April 7, 1879, and on July 28, 1879, the first list of telephone subscribers was issued. It is an odd-looking affair, framed in black and contains 27 names. To-day in Albany alone there are over 1,300 telephone subscribers, not to speak of the immense messenger call business and other features which have been added and are constantly growing. Mr. Uline was always among the first to adopt new devices and patents that tended to make more perfect the telephone service.

Since the beginning of 1890, A. B. Uline had made wonderful studies in perfecting the service of the Hudson River Telephone Company, notwithstanding he had drawbacks which would have discouraged many persevering men. The two great storms of snow and sleet which occurred in the Spring of 1891 are memorable ones. They broke down poles, destroyed wires and paralyzed the telephone and other electrical services. Yet Mr. Uline's activity perfected the service again, but only after the most ardent labor and supervision. The damage done by these great storms was fully reported at the time in the ELECTRICAL REVIEW. It must be remembered that the damage was not confined to Albany's system, but extended from Peekskill to Lake George, with any number of branches. Following these big storms came two fires in the Hudson River Telephone Building, the first of which destroyed the switchboard and the second the distributing board and the roof of the building. Nothing daunted at these serious draw-backs, Mr. Uline went to work and in a remarkably short time had the damage repaired.

Besides these achievements, Mr. Uline has made telephone history. The gaining of the underground franchise for the company in 1891, from the Albany common council, was a victory for him, and probably could have been gained by no other man, Mr. Uline's political influence being a large one. To-day the great work of the underground conduit is practically completed and ready for the wires.

No man could have exhibited more perseverance in the prosecution of a great suit than did Mr. Uline in the trouble which followed the adoption of electricity by the Watervliet Turnpike and Railroad Company in Albany about four years ago. This disturbed greatly the telephone service in this section. An injunction was then secured by the Hudson River Telephone Company restraining the railroad from using electricity, as it spoiled the telephone service. In the legal result the referee decided against the telephone company. The suit was then taken to the Supreme Court, each of three judges writing a separate opinion in the matter and reversing the referee's decision. The case is now in the hands of the Court of Appeals, General Manager Uline having pluckily fought the question inch by inch. Whatever the decision may be, the case will be a notable one in legal electrical history and will establish precedents in law.

The last great work accomplished by Mr. Uline was the erection of the handsome Hudson River Telephone Company's new building on the corner of Maiden lane and Chapel street, Albany, N. Y. The building stands almost complete to-day, and, in beauty and the perfectness of all sorts of equipment, it will be second to no telephone building in the world. All the labor of planning this in detail and supervising its construction fell upon the shoulders of Mr. Uline. With all these works and difficulties enumerated, it is not to be wondered that the general manager needed a relaxation from the strain of these arduous duties and undertakings. Mr. Uline was not only interested in telephony, but in politics and general affairs. He was a bosom friend of the late Daniel Manning, secretary of the treasury under President Cleveland, and was a democrat in politics. He served as a general committeeman from 1870 to 1876. He never sought political honors, however. Appointed a member of the board of municipal civil service commissioners, he was chosen and always made a faithful president of that body. In 1883 he was appointed a fire commissioner and has been reappointed again and again, serving on the board up to the time of his death. In July, 1884, he was chosen secretary of the board.

Mr. Uline was a prominent member of the masonic fraternity, with membership in the following organizations: Wadsworth Lodge, No. 417; Temple Chapter, No. 5; De Witt Clinton Council, No. 22; Temple Commandery, No. 2; Albany Conclave, No. 8; Knights of the Red Cross of Constantine and the appendant orders; Albany Sovereign Consistory of the A. A. S. R.; Cyprus Temple, N. W. S., and the Veteran Association. He was also a member of the Democratic Phalanx. In 1860 he was married to a Miss Schuyler, of Watertown, N. Y., who, with two daughters, survives him.

At a meeting of the board of fire commissioners the department houses were ordered draped in mourning, and his picture in the board rooms, as well as the city building, is festooned with deep black. A special meeting of the fire commissioners, Mayor Manning presiding, subsequently passed resolutions on Mr. Uline's death, and made arrangements to have the entire department turn out at his funeral. The remains are expected to arrive in Albany, April 15, and in that event the funeral will be held on the 17th inst. The obsequies will be conducted with masonic ceremonies, and will be in charge of Temple Commandery, No. 2, Knights Templar, of Albany. Flags throughout the city are at half mast in honor of Mr. Uline's memory. The funeral will be one of the largest ever held in Albany.

Telephonic News

*** A new telephone exchange is being built at Richmond, Ind.

*** The Muskegon, Mich., telephone system was damaged last week by lightning to the extent of $3,000.

*** The telephone company at McKeesport, Pa., have adopted the Shaffer long distance system and copper wires will be strung at once.

*** The capital stock of the Bell Telephone Company has been increased from $15,000,000 to $17,500,000. The company has in use 612,407 instruments, and has 180,391 miles of wire on poles, 14,954 miles on buildings and 70,334 miles underground, a total of 265,679 miles.

*** Pittsburgh now has telephone connections with New York and Philadelphia, and a long distance office has been opened in the telephone exchange in that city, which is already well patronized, principally by the large business houses. The tariff for a connection of five minutes with Philadelphia is $3, and with New York $4. The line is being extended West and is now open to Youngstown and Akron, Ohio. Communication with Chicago will probably be established in time for the World's Fair.

The Malone Telephone Bill is Dead.

The Committee on Gas, Electricity and Water Supply, of the New York legislature, after holding it for some weeks, on April 7 reported adversely the Malone bill for the appointment of a commission of the local authorities to regulate telephone charges in New York and Brooklyn. This is the bill prepared by the New York Board of Trade and Transportation and presented by its secretary, Mr. Frank S. Gardner, of whom Chairman Martin, of the committee, said:

"The committee, in making this report, have arrived at the conclusion that although the telephone subscribers are men of unimpeachable business reputation and unquestioned sincerity and honesty, yet they have made an unfortunate selection in the man whom they have sent to represent their interests in Albany. It seems to be the opinion of the committee and a large majority of the members that he is enthusiastically insincere. He annually appears at the close of every session demanding legislation which, it is said, he knows it is too late to grant. Furthermore, the committee was promised that proof other than his mere assertion would be furnished the committee. This long-awaited and patiently expected proof has not been submitted. The committee is unanimous in the belief that a State Board of Telephone Commissioners, to be appointed by the governor, would be the proper form of legislation on this subject. Railroad interests are governed by a State Board of Commissioners, insurance by a Supurintendent of Insurance, and banks by the State Banking Department. Why not place the telephone companies on the same basis? For these reasons, the committee has decided to report this bill adversely."

Mr. Malone presented a petition in favor of the bill which it took two page boys to carry. He said that he presented this in reply to Chairman Martin's statement that telephone subscribers did not ask for the passage of the bill. The committee had been appointed of men opposed to his bill, and only one of the committee, Mr. Ryan, of Westchester county, dissented from the report. He said that the telephone companies had grown to be a great monopoly, and that they should be curbed.

Mr. Connolly favored the lowering of telephone rates. He said that the companies charged an outrageous rental, and that their treatment of the public was unjust and oppressive. He did not like the form of the bill, but he thought the legislature should do something to reduce telephone charges.

Mr. Deyo said he was opposed to the bill because it put too much power in the hands of Tammany Hall.

The bill was killed by a vote of 75 to 40. Connolly, Sulzer, Hahlo and Sohmer, were the only Tammany men to vote against killing the bill. All the other Democrats from New York, except Webster and Farquhar, who dodged, voted to kill the bill. Conkling, Hoag and Wells, the New York Republicans, voted for the bill. It has been known for weeks that this bill was to be killed for certain peculiar reasons, and a good deal of interest was taken in the formal obsequies.—*New York Sun.*

PROGRESSIVE ELECTRICAL INVENTIONS.

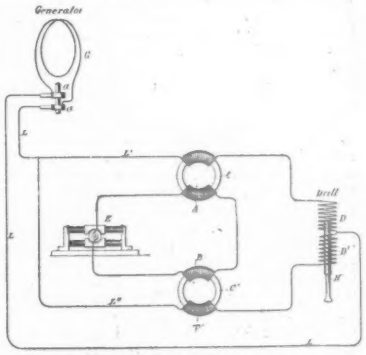
ELECTRICITY AS A DUST COLLECTOR.

A patent was recently issued to Richard E. Wardhaugh, of Jacksonville, Ill., for a dust collector in which an electrified coil surrounding a sheet iron cylinder is alleged to promote the efficiency of dust deposition.

Whether or not the alleged efficiency depends upon a static electrification the inventor leaves us in doubt. Through the coil is transmitted a battery current, and within the coil is arranged the dust collecting chamber, which is made of sheet iron or analogous material. Whatever efficiency the apparatus possesses, so far as electricity is concerned, is doubtless due to static electrification.

ELECTRIC DRILL.

In a patent recently issued to Henry N. Marvin, of Syracuse, is described an ingenious system by which an electric drill or reciprocating motor is operated by a single-phase alternating current. Mr. Marvin's construction is illustrated in the accompanying engraving. An alternating current generator marked G, delivering single-phase alternating currents, has one brush connected at a point between two motor coils D, D^1, where the circuit divides, one branch passing through one of the drill coils and a coil F on a magnetic ring C, the other branch passing through the other coil D^1 and a coil F^1 on the magnetic ring C^1, after which they unite and pass to the other brush of the generator. The two magnetic rings are maintained at saturation point by a battery or other generator of direct current passing through the polarized coils A, B. The coils F, F^1, are wound in reverse directions, so that when the alternating generator is delivering positive impulse this impulse will tend to supersaturate one ring and to cut down the magnetism in the other. By reason of the great choking action, however,



MARVIN'S ELECTRIC DRILL.

exerted by the ring in which the magnetism is being reduced, the bulk of the current will pass through the opposite ring and thus, as the alternating impulses delivered by the generator vary, the bulk of the current will traverse alternately the coils F, F^1, and the motor coils D, D^1 will, therefore, successively be brought into a condition of maximum action and the drill will be reciprocated in synchronism with the reversals of the alternating current.

SAFETY FUSE.

A novel safety fuse was recently patented by J. A. Wotton, of Atlanta, Ga., comprising a short section or cylinder of high resisting material, containing an explosive substance. The device is illustrated in the accompanying engraving, in which is shown a short tube, consisting of a mixture of carbon and clay, containing an explosive sub-

WOTTON'S SAFETY FUSE.

stance, such as gun cotton or mercury fulminate. The ends of the cylinder are copper caps, with which connection is made to the circuit. On an undue increase of current strength, the carbon cylinder is heated and ignites the explosive, resulting in a disruption of the circuit and extinction of the arc.

LIGHTNING ARRESTER.

A lightning arrester involving several interesting and novel features has recently been patented by Elihu Thomson. It is of a type in which the arc formed between discharge plates is blown out by magnetism. The accompanying engraving will serve to explain the construction and operation of the device. N, S, represent pole pieces of a magnet, either a permanent magnet or electro-magnet, on the adjacent faces of which are mounted two discharge electrodes shown as small buttons. The faces of the pole pieces are covered with mica, and a series of mica vanes, as indicated in Fig. 4, are placed radially across the space between the poles. Connected with the discharge points D may be a metallic bar *e*. The discharge points are placed in the middle of the pole pieces

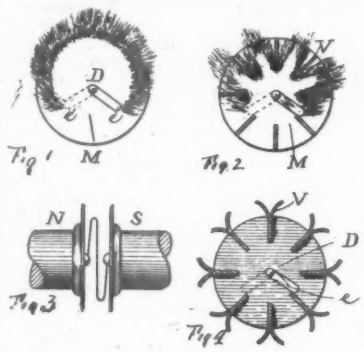


Fig 1 Fig 2 Fig 3 Fig 4

THOMSON'S LIGHTNING ARRESTER.

so as to be about the center of the magnetic field. Under these circumstances, when a discharge occurs between the electrodes, the magnetic field repels the arc, which is forced outward and, but for the mica vanes, would occupy a position indicated in Fig. 1; but the arc is broken up by the mica vanes so that it assumes an appearance like Fig. 2. The discharge does not remain for an instant at the center, but spreads radially outward at once and runs down the metallic extensions *e* which lead the heated gas to the sides, while the arc bows outwardly between the diverting plates or vanes which tend to elongate it into a star-like form.

"A Trip to the Moon."

This is the title of an illustrated scientific lecture presented bi-weekly at the Carnegie Music Hall, in this city. The Urania Astronomical Society, of Berlin, brought out this unique spectacle three years ago, since which time it has enjoyed great popularity. The managers of Music Hall—founded by Mr. Andrew Carnegie—secured not long since the scenery and apparatus for production at that hall. The lecture, since its introduction here, has been rewritten by Mr. Garrett P. Serviss, the well known astronomer and astronomical lecturer, and it is now presented in a manner which commands great interest and attention. The lecture is opened by some interesting statistics regarding distances, masses, etc., which are well calculated to astonish the unastronomical hearer. The first scene is the reproduction of a solar eclipse as it was seen from the shores of one of the Havel lakes, near Berlin, on the morning of August 19, 1887. On this morning the sun arose with the greater portion of its disk obscured by the moon. As the sun ascended, the crescent diminished, and at the moment of totality the wonderful corona flashed into view. This scene gives the listener an idea of what the astronomers mean when they attempt to describe this wonderful phenomenon. Slowly the moon passes from before the sun until the earth is fully illuminated and the sky and landscape assume their normal appearance.

Interesting as these imitations of celestial and terrestrial phenomena are, the manner in which they are effected is still more so, and our front page illustration gives a peep behind the scenes and explains the means by which the illusion is produced.

The trees and foreground are set in front of a transparent prospect, upon the back of which the opaque parts are silhouetted in black, leaving the sky and water translucent.

Two optical lanterns, one of which carries the crescent and the other the corona slide, are mounted upon a box movable along the inclined side of a triangular frame by a drum and cord, and are thus enabled to imitate the appearance and course of the heavenly bodies. The screen immediately below the horizon intercepts the image of the luminary below that line.

The waves that play upon the surface of the lake are produced by a slide in a third lantern. This slide consists of clockwork, governed by a set screw, and actuating three eccentrically mounted rods moving in parallel planes and supporting glass screens upon which waves are painted. The interference of these waves permits ribbons of light of constantly varying position and width to fall upon the screen and give the effect of water ruffled by a breeze.

The play of natural variations in color and intensity of light produced by the revolution of the earth and its passage through the penumbra and umbra of the moon's shadow and the development of full sunlight, are perfectly co-ordinated with the changing conditions of their source, the sun. This part of the illusion is effected by the management of the foot and border lights. These lights are red, white and blue incandescent electric lamps, arranged in series and controlled by a regulator permitting every possible variation, combination, graduation and intensity of tint, and to its intelligent manipulation much of the success of the scene is due.

Our interest in this mysterious darkener of the sun is now gratified by a view from the distance of 5,000 miles, showing the luner mountains and other prominent features.

The plaster image of the moon viewed through a circular piece of gauze set in a black drop curtain is three meters in diameter. The changes of phase are produced by the light thrown from the lanterns, as shown in the illustration.

The vicinage of Mounts Aristarchus and Herodotus, and a view of Cape Laplace, are shown from a height of two and one-half miles. These splendid scenes are a triumph of science and scenic art.

By trigonometric mensuration of the shadows and application of their values by perspective, the artist is enabled to represent the general features of the landscape with fidelity. These scenes are lighted from behind by four arc lights and a bench and foot lights, having a combined illuminating power of 8,500 candles; and well bring out the contrasts of earthly landscapes, softened and harmonized by the presence of air and life, with those of the moon, which, under a sky of eternal blackness, glitter in a jeweled panoply of death, for the moon is a dead world.

From the moon's surface the earth always seems to occupy the same place, and reflects to the moon a part of the light received from the sun. This earth light is observed when the new moon is first seen, and also when the old moon disappears.

The phenomena of earth light and sunrise on the moon is given by transparent earth painted in the sky and lit up by a lantern. The mountains on either side have a lantern each, whose light is permitted to fall on the drop by gradually lowering a screen.

A modified arc light illuminates the front of the scene and gives the earth light.

Probably the most unique of the cosmic phenomena unfolded is a solar eclipse viewed from the moon.

The earth is an opaque disk, with a red gelatine band attached to its circumference with white muslin, and suspended from two hooks set in a shelf extending across its back. A coat of phosphorescent paint gives the glow. The sun consists of a box with a cover of isinglass, on which the sun is painted. Semicircular wooden arms inclose a reflector, and support six incandescent lamps, set radially inward.

The box hooks into a piece of leather with a circular aperture coincident with the sun's face and sewed into the drop. Holes in the drop allow the light from an arc light to imitate stars.

The surface of the moon is painted on canvas supported on hinged props having spread feet; a stiff rod joins the hinges and forms the horizon. A foot light is placed within this tent-like cover to illumine it.

The drop curtain carrying the sun box is raised by a windlass, and as the sun rises, accompanied by the stellar host, the foot light is turned up. In passing behind the earth the sun imparts a crimson hue to the earth's atmosphere, which the foot light transfers to the moon until the extinction of the solar disk. The return to earth is marked by a view of that part of the earth's surface most resembling the moon's, the Tyrolean Highlands. The after-glow of sunset, moonrise and a lunar eclipse are depicted with great accuracy.

The gradual movement of a deep red gelatine film across the lantern slide holder causes the moon to appear to enter and emerge from the earth's shadow.

A sunset in the Indian Ocean and moonrise on the first scene conclude the lecture. A series of stereopticon views of great beauty are interspersed between the mounted scenes, and thus a continuous and most interesting entertainment is provided.

The scenery and ingenious mechanical effects are designed by Mr. W. Kranz. The regulator is the invention of Mr. J. Carl Mayrhofer, the electrician of the theatre. The stage plugs used for electrical connections enable that part of the work to be effected instantly. The work of this scientific theatre is not to be confined to astronomy alone, but is intended to embrace those sciences that can be attractively illustrated. —*Scientific American.*

A Memorable Gift.

Sir William Thomson, now Baron Kelvin, president of the Royal Society, has presented to the council of King's College, on behalf of Lady Siemens, the laboratory of electrical engineering given by her in memory of her husband, Sir William Siemens, and as a record of his many and valuable discoveries

FIG. 670.

in electrical science. The gift includes a bust of Sir William Siemens, beneath which is the inscription: "Sir William Siemens Laboratory. This laboratory was established by Lady Siemens for the study of electrical engineering," and presented to King's College, London, in memory of her husband, Sir William Siemens, D. C. L., F. R. S., and as a memorial of his valuable labors for the advancement of that branch of engineering science, 1891." Sir William Thomson said that Lady Siemens earnestly hoped that the desire which prompted her to take that form of memorial to her husband would prove of help in carrying out the advancement of that science. He felt that there was some appropriateness in his being asked to speak on that occasion, as he was probably the oldest friend of Lady Siemens among those present, and could bear testimony to the splendid manner in which her husband always devoted himself to scientific labors. His great work, in connection with Lewis Gordon and his brother, Werner Siemens, in electrical submarine telegraphy was known to all.

New Pull Down Switches.

The Interior Conduit and Insulation Company, of New York, have recently placed upon the market an article which is meeting with instant recognition and commendation from the trade. We refer to their new combined pull switch and ceiling pendant cut-outs and their new pendant pull switches, invented by Mr. E. T. Greenfield, the electrician of the company. These goods, made in a variety of forms, are illustrated and briefly described below.

Fig. 1 illustrates the interior mechanism which is employed in the different styles of switches and is concealed within the shells of the same. This new form of switch overcomes in every way the difficulties experienced in turning on and off any style of key socket suspended from flexible pendants. Grasping either the cord or lamp with the hand, the light may be turned on or off by a slight pull only. This form of switch will be found very advantageous for use in place of a key socket or other switch in circuit, as in clothes closets and in like places, where the lamp is in reach of the hand.

Cut No. 670 illustrates the switch made to fit the Standard Conduit branch junction

FIG. 1.

boxes and cut-outs, manufactured also by the Interior Conduit and Insulation Company, and Cut No. 674 represents the switch as adapted to the base of their "V. V." ceiling cut-out. The same mechanical principle employed in the combined pull switch and ceiling pendant cut-outs is used to great advantage in the pendant pull switches, cuts of which appear herewith.

Cut No. 727 is a pendant pull switch designed for attachment to flexible cords for controlling incandescent lamps with the same freedom and safety as is experienced in handling an ordinary push button on an annunciator circuit. The switch may be used as a pendant from the center of electroliers, thus dispensing with key sockets and affording ready means for easily controlling the current.

In general, it serves to bring within control lamps that are otherwise out of reach,

FIG. 727.

permitting them to be turned on and off from any point that may be reached by a flexible cord.

Cut No. 729 illustrates another application of the same mechanical principle embodied in the foregoing designs and may be used with advantage in flexible cord pendants where it is not convenient to substitute the combined ceiling pull switch and cut-out for the ceiling block already in use. This switch may be inserted in any flexible cord pendant by simply cutting the cord and attaching the terminals to the binding screws provided for that purpose. As in the other forms of the same switch, the light may be

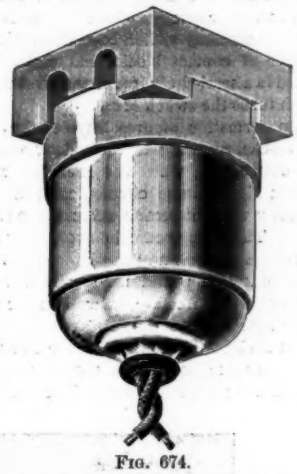


FIG. 674.

turned on or off by a slight pull of the cord only. These switches are easily and quickly wired and are thoroughly reliable in every respect. In view of the fact that all the productions of the Interior Conduit and Insulation Company are noted for excellence of workmanship and finish. It is hardly necessary for us to state that the articles described above are concise in form and present a neat and attractive appearance. Once

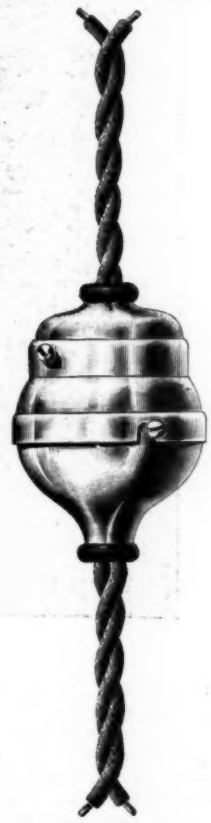


FIG. 729.

more this company have added a valuable article to their already long list of noteworthy specialties.

Removal.

The New York office of the Short Electric Railway Company has been changed. The somewhat limited quarters in the *World* building have been found altogether inadequate for the purpose. In the new Mills' building, 35 Wall street, will be found hereafter the same genial and gentlemanly representatives of this enterprising electric railway company. Mr. Edward E. Wessels, manager of the office, and Mr. C. C. Curtiss, confidential agent of the company, are rapidly making themselves a power in the street railway fraternity of New York and New England. They are to be congratulated upon their large and beautiful rooms and upon the fine display of electric railway apparatus which they are rapidly installing there.

TELEGRAPHIC

.... The Western Union Telegraph Company has established a branch office at the Union depot in Peoria, Ill.

.... Work is being pushed on the Gila Valley telegraph and telephone line between Bowie Station and Solomonville, Arizona, a distance of about 34 miles, and it will probably be completed and ready for business about May 1.

.... The House Military Committee will report favorably on the bill providing that any telegraph company may construct one or more underground lines from Washington, through Baltimore, Wilmington, Philadelphia and New York, to connect with all arsenals and other military posts adjacent to the cities through which it runs, including posts in New York harbor and the western extremity of Long Island Sound. One wire is to be rented by the government and the lines are to be constructed under government supervision. In case of war, one wire is to be furnished the government free of charge.

.... Should the government obtain control of the telegraph system of this country, as is the case abroad, the people at large would, no doubt, be afforded much better facilities in many ways than they are now able to obtain. In the matter of offices alone there is much room for improvement, as the government could maintain offices at little or no additional expense in connection with the post office in small towns, where, under the present system, it is impossible to make them self-supporting. There are in this country 18,000 offices, railroad included, to 673,000 miles of wire, and in all other countries an aggregate of 53,000 offices to 1,111,968 miles of wire.

.... The telegraph operator who cut his throat with a razor last week at the Western Union Hotel, West and Cortlandt streets, New York, where he had been living as William Roberts, is S. G. Saunders, a well known "old-timer" who has worked at 195 Broadway for about 20 years, and for 10 years more in different parts of the country. He is reported to be in a critical condition. Saunders comes from St. Louis. He served through the war in a Missouri regiment, and was at the first and second battles of Bull Run. He entered the telegraph business after the war, and has been in it ever since. He is about 50 years old and a bachelor. He has been somewhat eccentric of late, and had some religious mania about two months ago. Then he took to drinking heavily, and was trying to borrow a nickel the night he attempted suicide.

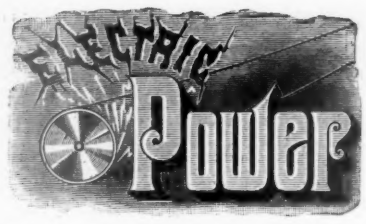
Falling Into Line.

It is rather a noteworthy fact that out of 16 cities in the United States of over 200,000 population, 14, or over 87 per cent., are using the electric railway or equipping roads with the system. Again, out of 42 cities with populations ranging between 50,000 and 200,000, 41, or over 97½ per cent., are using the electric railway system.

Philadelphia and New Orleans are the two large cities which have not yet adopted the electric railway, and New Haven the only one among the smaller. These places are contemplating the adoption of electricity for street car propulsion, and probably before the end of this year the system will be in use in all of them.

Brooklyn was one of the last to come into the fold; but an order just given the Thomson-Houston Electric Company for 600 car equipments (1,200 motors) shows that she is striving to make up for lost time.

Altogether there are now 222 roads in operation and under contract using the Thomson-Houston apparatus, with a trackage of 2,600 miles and over 4,300 cars.—*Thomson-Houston Bulletin.*



* * The Mt. McGregor railroad will probably be operated by electricity as a motive power in the near future.

* * Electricity is to be substituted for mule power on the lines of the Consolidated Piedmont Cable Company in Oakland, Cal.

* * The Shaw Electric Crane Company, of Muskegon, Mich., are now building an electric crane with a lifting capacity of 160,000 pounds.

* * The entire outfit for the Grant street electric railway line in South Seattle, Wash., is now on hand and it is expected that the road will be in operation within the next 30 days.

* * Up to March 1, 1892, the electric railway business of the Thomson-Houston Electric Company is shown by the following figures: Total number of roads in operation and under contract, 222; total number of cars for roads in operation and under contract, 4,319; total miles of track in operation, 2,626.86.

* * The receivers of the Wenstrom Consolidated Dynamo and Motor Company have, by virtue of a decree of the Circuit Court of Baltimore City, advertised all the real estate, buildings, tools, patent rights, plant, stock on hand, etc., belonging to the Wenstrom Consolidated Dynamo and Motor Company to be sold at auction on May 2, 1892. This company has very valuable patent rights, also water power plant. Full information regarding terms of sale can be had from John E. Semmes and B. Howard Haman, receivers, Baltimore, Md.

* * A syndicate of Cleveland capitalists, consisting of John J. Shipherd, Thos. Jopling, G. H. Kimball and Howard P. Eells, has acquired the controlling interest in the South Covington & Cincinnati Electric Street Railway. The system will be extended so as to run from Cincinnati to the Latonia race track, back of Newport, Ky., and take in the territory from Dayton to Ludlow, Ky., along the Ohio river. The road has already proved a paying investment, and, with the extensions contemplated and the increased territory to draw upon, it will be a very valuable property. It is stated that the capital stock of the company will be increased to $1,000,000.

PERSONAL.

Mr. J. R. Mulvane, of Topeka, Kas., president of the Missouri & Kansas Telephone Company, was a visitor to the REVIEW office last week.

Tending Store by Telephone.

A gentleman was trying to talk with a neighboring town the other day over the long-distance 'phone, and was seeking a little information that was current on the streets of the town. Could anybody be found who would go out and pick it up? The young man at the distant 'phone was disinclined to accommodate without stating the reason why, and finally the help of Utica "Toll-board" was implored. The conversation between "Toll-board" and the distant town was quite interesting. "Just step out on the street," she told him, "and ask the first man or woman you meet."

"I can't," he replied, "as there's no one here to watch the store."

"Oh, is that all," said "Toll-board." "Well, you run right along and I'll watch the store for you."

The young man went and "Toll-board" kept her word by keeping her ear to the receiver at Utica, 40 miles from the scene.—*Utica Observer.*

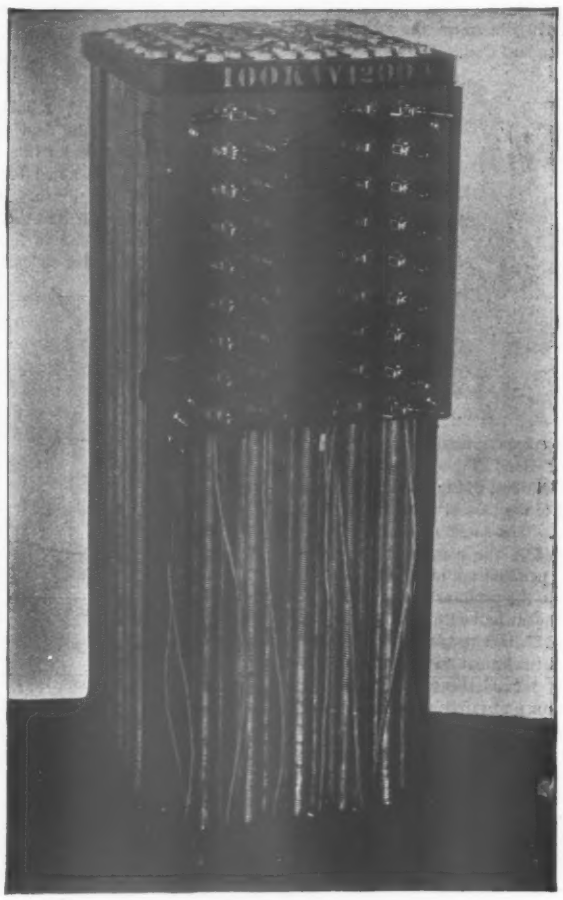
A New Edison Rheostat.

A new starting and controlling rheostat for motors running on high voltage currents has been recently designed by the Edison General Electric Company.

This rheostat is a modification of the standard Edison starting box for motors of large current capacity, which is furnished with an ordinary switch base, fitted with a number of contact blocks and plates, arranged in a semi-circle around the pivot upon which turns the switch arm.

The formation of arcs between the contact blocks, resulting in their deterioration and destruction, when the rheostats were used on high voltage circuits, constituted a difficulty which it became necessary to eliminate. The arcing could be avoided by employing a larger number of blocks on the board, but this would necessarily increase the cost of manufacture, as well as the size of the board.

The modification consists in the substitution of a switchboard with several separate and distinct switches, in place of the ordinary board just mentioned. By the employment of several separate switches, it is possible to arrange the coils of the rheostat in multiple with themselves so that if it is required to carry a larger current, or remain in circuit constantly for the purpose of reducing the speed of the motor, it is comparatively simple to manipulate the switches according to requirements. The resistance is built up of tinned iron wire wound in spirals, arranged in sections. Each of these sections can be thrown in or out by means of its proper switch.



A NEW EDISON RHEOSTAT.

The rheostat shown in the cut is designed to start and control the speed of a 100 kilowatt motor, working on a 1,200 volt circuit. The range of resistance is very wide, its greatest resistance being 72 ohms, while, with the switches properly arranged, it can be reduced to .25 of an ohm; the current carrying capacity for the smaller resistance being increased in the same proportion. The over-all dimensions of the box, shown in the cut, designed for an electric mining plant, are: Height, 5 feet 6 inches; width across switchboard, 28 inches; depth, 26 inches.

Rheostats of this design are absolutely fire-proof, are strong and substantial in construction, and have been arranged with a view to securing a high insulation resistance.

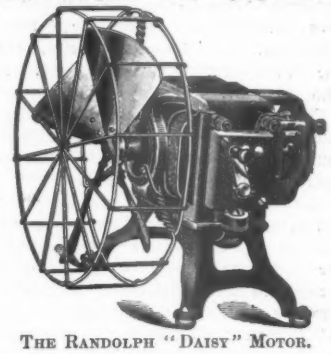
The Patent Office.

The crowded condition of the United States Patent Office, to which we have before referred, has at last resulted, it seems, in the practical breaking down of one department of the work of the office, since it is announced that no more copies of current patents can be sent out to applicants for them until better facilities are provided for storing them. In the meantime, we suppose there are thousands of books of blank orders which have been sold to citizens all over the country with the understanding that, by simply filling out the blanks and mailing them, copies of patents specified would be sent.

If a private firm should thus neglect to carry out its plain obligations there would probably be some remedy, and that remedy would be very quickly applied. But, in this case, there is probably no remedy, and things will be no better until a sufficient number of Congressmen have been impressed with the necessity of doing something about it. It is often of great importance to manufacturers, inventors and designers, to obtain promptly copies of patents as issued, so far as they apply to certain lines, and, in view of the fact that the government is regularly making a very handsome profit out of the Patent Office, it would seem to be nothing less than an outrage that those from whom this profit is made should be deprived of the means of knowing what is being done by other inventors, because another department of the government (land office) has been allowed to encroach upon the Patent Office until there is actually not enough room in which to do the business. It would be a good idea, perhaps, if every inventor or manufacturer who finds himself inconvenienced by this matter would immediately write to his Congressman, urging upon him the necessity for taking some action in this matter. When enough of such letters are received by members of Congress to make an impression upon them, something will be done about it. This practice of writing to Congressmen regarding any abuse which seems to need remedying is one which should be more generally followed. It is altogether probable that if, say, 25 to 50 prominent manufacturing firms and inventors should write to the Congressmen representing their districts, complaining of this thing and asking that something be done about it, something would be done.—*American Machinist.*

A New Fan Motor.

R. J. Randolph, until recently with the Excelsior Electric Company, has brought out and is manufacturing on a large scale a new fan motor which will be known as the Randolph Daisy, with headquarters at 425 "Rookery," Chicago. This motor is well built mechanically and well balanced. The bearings are long and of *lignumvitæ*, thus making the motor noiseless and with bearings that require a small amount of lubrication. The fan has a regulating switch that controls the speed at will, varying from 900 to 1,200 and 1,800 revolutions. The current required is equal to that required to run an incandescent 16 candle-power lamp at 110 volts. The rheostat is placed beneath the motor, but does not detract in any way from the neat appearance of the fan. The blades are enclosed in a strong wire guard, thus preventing any danger from accidents. The motor has no external magnetism, and it is claimed that it will not spark at the commutator. The accompanying illustration will give an idea of the general appearance of the fan and motor.



THE RANDOLPH "DAISY" MOTOR.

"Splendidly Got Up."

[*London Industries.*]

The ELECTRICAL REVIEW of New York has celebrated the tenth anniversary of its birth by a special number. This is splendidly got up, and contains a most interesting account of the progress of the various branches of the electrical industry over which it has watched for the last 10 years. Ten years in general history is a short time, but it is a long period in connection with the development of electrical engineering in America.

Fire in the G. N. W. Telegraph Offices at Montreal.

Some of the liveliest work that has ever been done by the operators of the G. N. W. Telegraph Company was accomplished in the Montreal offices on the night of March 8, in connection with the Quebec elections. The returns from a district 800 miles in extent were collected and given out by 10 o'clock. At the conclusion of five hours of unusually hard work, many of the operators went home, while others remained to send out special reports to the press. The attention of the night manager, Mr. W. B. Rivet, was called, shortly after 12 o'clock, to a jet of smoke issuing from between two sub-sections of the company's big switchboard, into which ran over 100 wires. Seizing a hand grenade, Mr. Rivet attempted to smother the flames, but without avail. An alarm was sent in to the fire department, and when the firemen arrived, the fire, running along the oil-soaked covering of the office wire, had reached the ceiling, where, covered by the plaster, it was extremely difficult to deal with. There was some delay in getting the hose up the winding stairways to the operating room, but a good pressure was obtained, and after an hour's hard fight, during which time the ceiling was torn down, the fire was got under control. The connections from the switchboard to the operating tables were ruined, the floor piled with *debris*, and the two lower flats of the building flooded with water. It was thought at one time that all the valuable apparatus and batteries of the company would be destroyed, but fortunately these were saved.

The operators stuck to their instruments as long as it was possible for them to do so. One of them who was sending to Toronto advised the operator there that the building was on fire and that when he could get no further response he would know that the wire had given out. Shortly after communication was suspended, and the Toronto man concluded that for once the expected had happened.—*Canadian Electrical News.*

The Thomson-Houston Alternating Street System of Incandescent Lighting.

This system of illuminating streets is becoming more popular as the electric lighting of towns is extended, and becomes especially valuable in outlying districts where an arc light is unnecessary and, in many places, unsuitable on account of the abundance of shade trees. The system requires less attention, may be extended over greater distances, and it is claimed may be installed with less cost than any other system of electric street lighting devised to fill the same place.

One of the most valuable features of the system, especially for its use in small towns, is that the same dynamo furnishes current for both the street system and the interior lighting of stores and houses; this enables the lighting company to furnish current for inside and outside lighting at a minimum of expense for construction and the highest economy in operating.

The circuit for this street lighting is taken from the feeder board of the alternating current system in the station, passes through a single pole switch and fuse, then through the bank-board and from here to the outside circuit; the line then passes through the lamps placed in series and finally joins one of the two trunk wires at any convenient

FIG. 1.—THOMSON-HOUSTON CURRENT INDICATOR.

point, passing through a single pole primary switch and fuse box at the place of junction.

The bank-board is a slate slab highly polished and with beveled edges, as shown in the accompanying diagram, and fitted with a current indicator and five relief lamps. As long as all the lamps are burning on the circuit the current indicator stands at its normal mark, viz., 3.5 or 5.5 amperes; but if one of the lamps is extinguished the current at once rises on the current indicator and one of the relief lamps on the bank-board is thrown into circuit to restore the balance of the system.

The lamp is of the series type and made to carry a current of 3.5 or 5.5 amperes. The number of lamps in each circuit is determined by the voltage and current of the lamp.

The base of the lamp contains an automatic film cut-out which is ruptured by the current when the filament can no longer carry it, the lamp is immediately short-circuited and the circuit preserved intact. This simple but sure working cut-out device takes the place of the old style magnet cut-out which necessitated such a large and expensive attachment to each socket. The patents on this form of cut-out are owned and controlled by the Thomson-Houston Electric Company, and suits are now pending against other companies who are using this valuable feature and thus infringing patent rights.

The socket used for this system is provided with a spring cut-out, which makes a path for the current when the lamp is taken out. The socket is made to resist the force of the wind and storms, thus being especially designed for outside use.

The shade and arm shown in the accompanying illustration is used in connection with these lamps and is readily attached to the wooden post upon which the lines are carried. The form of the shade is especially designed to direct the light in a horizontal direction and not, like most shades, directly downward.

An insulating device is placed directly over the shade where the lines enter, protecting the entire system against liability of grounding through the iron arm and wooden post. Other forms of suspending these lamps have been devised, and specifications of same will be furnished upon application. This system is now in use by about 200 central stations, operating a total of 10,000 streets lights of candle-power varying from 20 to 50.

FIG. 2.—THOMSON-HOUSTON ALTERNATING CURRENT STREET LIGHT.

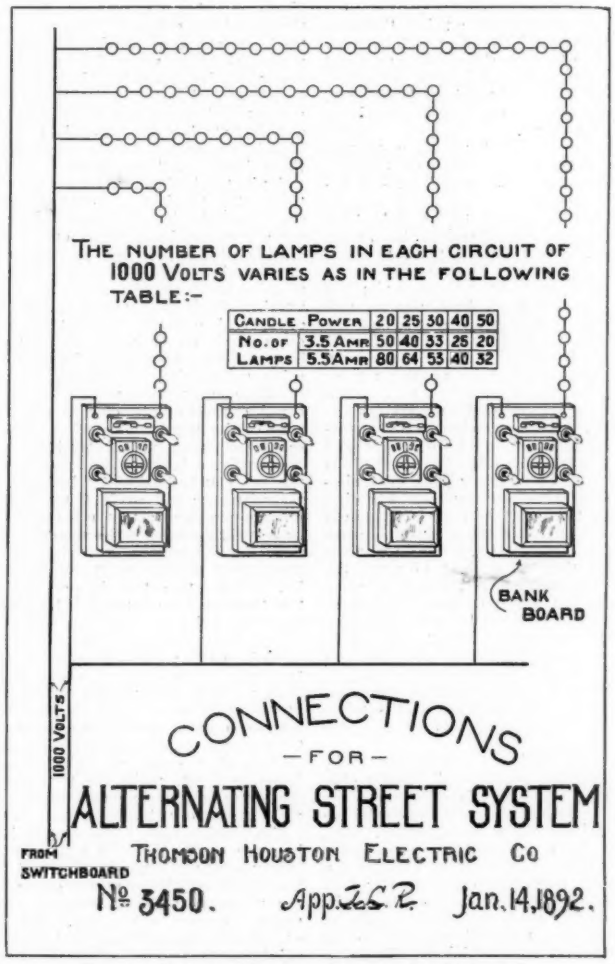

THE NUMBER OF LAMPS IN EACH CIRCUIT OF 1000 VOLTS VARIES AS IN THE FOLLOWING TABLE:-
CANDLE POWER 20 25 30 40 50
No. OF LAMPS 3.5 AMP 50 40 33 25 20
5.5 AMP 80 64 53 40 32
BANK BOARD
1000 VOLTS
CONNECTIONS
-FOR-
ALTERNATING STREET SYSTEM
THOMSON HOUSTON ELECTRIC CO
FROM SWITCHBOARD
No 3450. App. 252 Jan. 14, 1892.

FIG. 3.—THOMSON-HOUSTON CONNECTION DIAGRAM.

LITERARY.

"In a Steamer Chair, And Other Shipboard Stories," by Robert Barr (Luke Sharp), will soon be issued in Cassell's Sunshine Series. Mr. Robert Barr is the latest, but not the least, of American humorists. He won his spurs on the Detroit *Free Press*, to which he contributed as "Luke Sharp," and now he is in England associated with the youngest of English humorists, Jerome K. Jerome, in the editorship of *The Idler*. Mr. Barr's humor is typically American, which means that it is spontaneous and convincing. His book is bubbling over with fun and will make a dull hour merry.

"To Be Congratulated."

[*Frank Leslie's Popular Monthly.*]

The ELECTRICAL REVIEW is to be congratulated upon the completion of the first decade of its flourishing existence. It has celebrated its tenth birthday by giving its readers a literary feast in the shape of a beautiful Decennial Number. On the menu of this feast are articles on electrical men and their work, the electric light and electric power, the telegraph, the telephone, the storage battery, electrical progress of the last 10 years, the city of Buffalo, where the Fifteenth Convention of the National Electric Light Association was held, and other like subjects. A large number of illustrations, many of which are portraits, add interest to the text. The ELECTRICAL REVIEW is the oldest electrical journal in America. It had a very modest beginning; being a small sheet with no illustrations, but, like the science it represents, it has developed with wonderful rapidity, so that it is now an influential journal of voluminous size, well printed and plentifully furnished with illustrations. The REVIEW is ably edited by Mr. Charles W. Price, a well-known New York journalist, who has made his paper the standard electrical journal of this country. Mr. Price is the secretary and treasurer of the International League of Press Clubs, which held its first annual convention at San Francisco last January, and to which he went as a delegate from the New York Press Club.

ELECTRIC LIGHT NEWS

—— An English syndicate has offered $500,000 for the electric light plant at Salt Lake City, Utah.

—— The gas and electric light companies of Malone, N. Y., have consolidated, with a capital of about $50,000.

—— Governor Flower has signed a bill authorizing the erection of a $12,000 electric light plant at Westfield, N. Y.

—— The Edison Electric Light Company, of Philadelphia, has declared a dividend of three per cent. on its capital stock of $1,000,000.

—— The new Otto gas engines which are to run the plant of the Willimantic, Conn., Electric Light Company are in position and have been tested.

—— Bonds in the sum of $40,000 have been filed by the Swift Electric Light Company for the faithful performance of its contract for city lighting at Saginaw, Mich.

—— Recent experiments in signaling between ships at sea by means of flashes from the electric search-lights, using the Morse code, short flashes representing the dots and long flashes the dashes, have demonstrated that communication may be maintained between vessels separated by a distance of 60 miles.

—— The Bristol, Pa., Electric Light and Power Company, at its third annual meeting, held last week, declared a dividend of five per cent. and re-elected the following officers: George A. Shoemaker, president; A. Weir Gilkeson, secretary; Charles E. Scott, treasurer; G. A. Shoemaker, W. H. H. White, L. Landreth, Frank F. Bell and A. Weir Gilkeson, directors. The new brick building was paid for from the earnings of the past year, and the finances were reported to be in a healthy condition.

NEW INCORPORATIONS.

Syracuse, N. Y.—The Syracuse Storage Battery Company; capital, $300,000. Promoters, Chas. L. Pack, Jacob Amos, Chas. M. Warner, all of Syracuse, N. Y.

Canton, Mo.—Canton Electrical Company; capital, $4,500. Promoters, W. E. Agee, T. L. Durhee, W. B. Horton. Incorporation papers sent to H. C. Chinn, Canton, Mo.

Omaha, Neb.—New Omaha Thomson-Houston Electric Light Company; capital, $1,100,000. Promoters, E. S. Wiley, H. E. Chubbuck, Jno. L. Martin, Omaha, Neb.

Green Bay, Wis.—Citizens' Electric Company; capital, $25,000. Promoters, J. H. Ebeling, H. W. Hart, F. B. Warren. Incorporation papers sent to J. C. and A. C. Neville, Green Bay, Wis.

Pueblo, Colo.—The Rocky Mountain Electric and Power Company; capital, $500,000. Promoters, Moses L. Stern, David F. Urmy, Geo. H. Hobson, E. C. Humphrey, Geo. W. Robinson, all of Pueblo, Colo.

Palestine, Tex.—The Palestine Water and Power Company; capital, $100,000. Promoters, Carlos S. Greeley, Dwight Treadway, Melvin L. Gray, Sam'l G. Kennedy and N. Oscar Gray, St. Louis, Mo.

Kenosha, Wis.—Kenosha Electric Street Railway Company; capital, $100,000. Promoters, J. W. Munson, H. Pennoyer and H. B. Robinson. Incorporation papers sent to Cavanaugh and Fisher, Kenosha, Wis.

New York City, N. Y.—The Felt Electrical Light and Power Company (incorporated in West Virginia); capital, $5,000,000. Promoters, Geo. H. Felt, N. B. Armory, S. L. Felt, all of New York city. Incorporation papers sent to Noel B. Armory, care of Geo. H. Felt, 258 West Twenty-ninth street, New York city.

Modern Views of Electricity.

READ BEFORE THE BOSTON ELECTRIC CLUB, APRIL 6, 1892, BY WM. STANLEY, JR.

As we look back over the history of mankind and scrutinize the thoughts of the foremost men of each age, we find that, from the earliest dawn of intelligence down to the present day men have speculated on the possible causes of the existence of the world about them. Until a few years ago, until almost within the memory of living men, our race, with few exceptions, has accepted the doctrine of creation as the necessary and satisfactory basis, or explanation, of our existence, the existence of the organized world, and by inference has assumed that the processes of nature being of divine origin were beyond human conception. Within the last two centuries scientific investigation has discovered a great number of natural laws, which, after careful study, having been classified and selected, are now the recognized standards of the performance of nature, under given conditions, and form a new basis for speculation on matters concerning which experimental data is unattainable with our present knowledge.

As these natural laws are studied, we find that they show that, under like conditions of cause, the same result is always attained in the same way, or, briefly, they describe the operation of forces in producing results discernible by our intelligence. We are all familiar with the manifestations of force, the various forms of energy, while we have no language with which to make force intelligible to our minds. We speak of electric force, thermic force, gravitational force, mental force, and we mean the ability to perform electric work, the ability to increase or decrease thermic energy, the ability (for reasons still unknown) possessed by bodies of attracting each other, the ability to perform mental operations. We are accustomed to think of these forces as resident in matter, depending upon its physical condition and structure.

The subject I wish to call to your attention to-night refers to some of the modern views respecting the methods by which these forces act to accomplish the results we are familiar with, and I shall endeavor to outline in a very popular and elementary manner the conceptions of the medium in which they act, known as the ether.

First, as to the medium, it is very desirable to ascertain if the various forces of nature act to convey each their particular form of energy in the same or in independent mediums. Is there one medium by which every form of energy is carried, or does such form of energy use an independent path by which to travel?

As in every broad question of this character, experimental evidence at first appears contradictory, for we find that some *substances* convey heat and electricity, some light, and that no two *substances* offer paths of equal freedom to the translation of all forms of energy. For example: If we look at the filament of an incandescent lamp we see that light emerges from or is radiated by it in every direction; some medium is conveying light from the filament across the empty space enclosed by the globe through the glass across the air to the eye. Whatever the medium may be, it must exist in the vacuous space enclosed by the globe, in the glass, in the air, in the eye and, in fact, *in the brain;* in short, we see that the medium conveying light must exist in the same space as ordinary matter, and must exist in space unoccupied by matter. Suppose, now, we hold an opaque object, such as a sheet of hard rubber, between a luminous body and ourselves, we find that the light conveying medium has, so to speak, stopped, or its ability to carry light has been destroyed by the rubber, as no light can reach beyond this boundary line.

We know that a lamp emits heat as well as light; this heat is found on and outside of the glass, and, being radiated across space beyond the bulb to great distances, may be made perceptible by proper instruments. If, now, we insert a screen of hard rubber between the source of heat and ourselves, and test the decrease of heat caused by the insertion of the screen, we find but little diminution of its power. We learn from these experiments that while hard rubber has the power of stopping the radiation of light, it does not equally stop that of heat; or that while it interferes with the conveying power of a medium which passes along light waves through air or glass, it does not in like manner necessarily interfere with the conveying power of the medium transferring heat.

We might, therefore, imagine that each force, as light, heat or electricity, was conveyed by a separate medium operative when occluded in certain substances, and inoperative in others, or that the various forces possessed some difference requiring specific conditions of universal medium to accommodate their transmission. One of the modern theories of the subject, a theory that has withstood thus far a great number of investigations, is the outgrowth of a very old conception.

According to this theory, the universe throughout the entire extent is filled full of a something which is called the ether, and which forms the highway over which all energy in whatever form, whether as heat, light, electricity, magnetic or chemical energy, is conveyed. We may imagine an infinite sea of this substance in which this and all other worlds are sunk or suspended; such a sea must be considered to be extremely strong or dense and infinitely elastic. If we conceive of such a medium or substance we can then form theories describing the methods by which energy is translated from one point to another that appear in accordance with our present knowledge. Of course, the first question such a proposition brings up is how do we move about in an extremely strong or dense substance. If a man were immersed in solid cast iron he, of course, could not move. To obviate this difficulty we might imagine the man to be bored full of holes in a certain direction, and imagine also that these holes were occupied by the ether, a very strong substance as iron, then, except for the difficulty of turning a corner, our unfortunate friend might travel about passing *through the iron*, while the iron remained stationary. To further help the assumption, we can assume the holes to be infinite in number and extremely small. I do not mean as small as the holes in a fine piece of muslin, nor as small as a molecule, of which millions would be required to make the extreme point of a needle, but millions of billions of times smaller, so small, in fact, as not only to be forever indiscernible, but so small as to be undiscoverable by the man.

This gauze-like hypothetical substance, then, may exist everywhere undiscerned of itself, and may be endowed with all the properties the assumption of which is necessary for the explanation of the propagation of forces from point to point.

A body or substance of a thing then actually moves through the ether, not between it; a bird flies through the air by parting it on either side, but passes from place to place in the ether without disturbing or parting it, the ether passing through this moving body as such body moves.

What basis have we for such a conception? Is there any evidence of such an ether—of an ether conveying all sorts of energy, so to speak?

We have seen, in short, we know, that the various forms of energy—light, heat, magnetism, etc.—can go from point to point through a vacuum; magnetism passes through vacua as easily as through air; it is well known that light, heat, electric and magnetic forces reach this earth from the sun; these forces have to pass through vast spaces void of matter. Evidently, then, any medium forming a common path for these energies must be independent of material substance as we ordinarily understand the term. Now, we have experimental data proving that the propagation of light, heat and electricity is the same. We have tested our ether and have found that a light, heat, electric or magnetic impulse travels 186,000 miles per second through the ether in vacuo; if the transmission takes place through some *substance*, as, for instance, if a light wave be transmitted through a sheet of glass, the speed of transmission is reduced in some way we do not yet understand, and some of the energy of light disappears, taking on the form of energy we call heat. But if, as I have said, the transmission occur only in vacuo, the distance traversed per second by all the various forms of energy is the same, and this now well established fact is taken as indicating the existence of but one universal medium.

I have said that our conception of the ether required a property of infinite elasticity. You know what elasticity is. We are familiar with more or less perfect elasticity in various substances, as rubber, ivory, glass, etc., but a perfectly elastic substance is a very different conception. Imagine a billiard ball possessing this property; then if such a ball could be dropped from any height upon a perfectly elastic block of glass in vacuo, it would rebound to exactly the height from which it fell, and it would continue to so rebound forever, the property of perfect elasticity always restoring to the ball the same energy of position originally given to it. Or, conceive a tube of some perfectly elastic substance, say glass, reaching from this earth off through space indefinitely, then if one end of this tube were struck by a hammer the shock would cause a wave or compression to travel outwards along its length, which, when once started on its journey would continue forever. Imagine the speed of travel of the wave to be 186,000 miles per second, and the simile may be thought to represent the travel or transmission of energy along a tube of ether, each impulse or wave being capable of delivering a certain amount of work dependent upon the force of the initial blow. Let us for a moment consider the modern picture, conception or theory, of how forces are transmitted in this assumed ether; consider a tube of ether capped at each end with some substance; picture it as consisting of glass or some perfectly elastic substance; and suppose one end of it to be in Boston and the other in New York. Call this tube an ether tube. Imagine some mechanical contrivance by which a hammer is made to strike the end of the tube in Boston with ever-increasing speed; thus let there be 100 blows on the tube during the first second, 200 blows during the next second, etc.; the tube then will be expanded at the point of contact with the hammer, that is, increased in diameter, by an amount depending upon the strength of the blow. As the tube is perfectly elastic, this local swelling or expansion of the tube started in Boston will travel to New York at the rate of 186,000 miles per second. Suppose, at New York, branch ether tubes are connected to the trunk line, let one such tube be joined to a thermometer, another to a man's eye and another to a bottle containing hydrogen or chlorine. Then, as soon as the hammer is started in Boston, ether waves travel through the tube to New York and traverse the various branch circuits, one of which leads to the thermometer. As they reach this instrument they will suffer a change, so to speak; we may think of them as being shocked in some manner that causes them to deliver their strain energy as heat, which will be registered by the thermometer, the same heat that would have appeared had the hammer struck the solid substance in New York. For some time after the starting of the hammer at Boston the eye connected by the branch ether tube will fail to record any sensation of light and the gases in the bottle will not combine, but when the hammering at Boston becomes extremely rapid—when the number of blows at Boston exceeds 450,000,000,000 per second—the eye at New York, connected by the branch ether tube, will discern a faint red light, which, continually increasing in strength and changing in color with the increasing number of blows at Boston, will successfully present to the eye all the colors of the spectrum. As the blows approach 750,000,000,000,000 per second, the blue violet light visible to the eye would fade away into darkness never to be illuminated again by the increasing frequency of the ether waves, while the violent chemical combination will take place in the HCl bottle, caused by the combination of these elements in forming HCl.

A plant or leaf connected by another ether tube to the trunk line would also then decompose carbonic acid from the surrounding air and would build up its own structure. During all this time the thermometer first mentioned would continue to register an increasing temperature. As the frequency or number of blows per second is further increased, they would undoubtedly perform other work on organized matter; but we have no organs or powers by which to perceive such results. If, now, at any time during these experiments we have assumed, we could connect a voltmeter to the opposite sides of the trunk line, each passing wave sent from Boston would develop an electromotive force between the opposite sides of the ether tube and would be indicated by the voltmeter; and, again, if we could apply a magnetometer to two other sides of the tube at right angles to the voltmeter connection, the magnetometer would indicate the presence of magnetism as each wave passed by. We see, then, that the modern theory of the transmission of energy is founded upon the assumption of a universal medium traversed by a wave-like disturbance; if this disturbance be a rapid succession of waves transmitted in a certain direction, so long as these waves do not exceed a certain number of 400 billion per second, the entire energy appears to us as heat; if the frequency of these waves exceeds 400 and is less than 750 billion, they cause the phenomenon we know as light, while the phenomenon of electricity or electric strain takes place at right angles to such direction.

Can we then form some theory, described by some simile, that will explain how electricity is conveyed in a conductor? Let us consider what theory points out as happening when an alternate current generator urges a current over a line. We have assumed in our ether theory that all space and substance is full of ether. Imagine the ether within a copper wire to be somewhat different from the ether outside in the air, and suppose it to be subject to pressures or strains when connected to some mechanical device, and assume that an alternate generator is a device which, when connected to the ether contained in the wire, gives it a peculiar screw-like thrust, first in one and then in the opposite way as each successive electromotive force is induced in the armature circuit; these ether thrusts then represent the electromotive force waves of the generator. They cause the ether in the wire to be driven or compressed in the direction of the length of the wire, and this compression may be thought to represent a flow of current. I have said the ether thrusts of the generator were screw-like, that is, both rotary and forward, the thrust along the wire corresponding to the pressure or electromotive force is the forward thrust; the rotary thrust tends to rotate the ether in the conductor about the axis or center of the wire. Of course, the ether in the wire is but a part of, and is directly connected to, the ether throughout the rest of the universe; the rotary movement of the ether within the wire must, therefore, tend to rotate the ether about it. Now, we know that the travel of an ether movement is at the rate of 186,000 miles per second, and consequently the ether 186,000 miles away from the wire will receive a rotary impulse or strain one second after the starting of the rotary impulse within the conductor. During this second the rotational effect has progressed through the space mentioned.

The transmission of a current or the generation of an electromotive force along a wire, then, radiates outward ether waves, outward at right angles to the direction of current transmission, and we have seen that if we get enough of these waves we obtain light. If, therefore, we could make an alternator that would twist the ether within a wire 400 or 500 billion times per second, we should radiate light from the surface of the conductor in every direction, or, briefly, the wire would be luminous. We may consider a dynamo, then, to be a sort of ether hammer or shaker, which sets up a very peculiar and complicated ether motion. When we produce light in a carbon filament, we make use of the resistance property of that material, which property seems to consist in a sort of dampening of the ether waves, transferring such ether motions into motions of the individual molecules of the filament. In fact, whenever ether motions take place in *any* substance they set up vibrations of the molecules of that substance, which molecular disturbance is evident to us as heat; thus some of the waves of the sunlight falling on the window pane are arrested and cause motions away from the molecules of glass which warm it, the glass being able to exercise a sort of selective power, stopping some ether waves and passing on others. All substances exert this power; those substances which transmit or are transparent to very fast waves, stop or are opaque to slow waves; thus glass is transparent to the short, quick waves of light and opaque to the long, slow waves of heat, while hard rubber is transparent to the slow heat waves which are, of course, entirely invisible, and opaque to the fast, quick visible light waves. Now, as I have said, our eyes are tuned to or respond to ether waves which occur between 400 and 750 billion times per second; the eye of a cat is tuned to a somewhat lower range. We can imagine an animal whose eye would respond to a very low frequency, so low that the ether waves radiated by an alternate current circuit would excite vision; to such an eye a sheet of hard rubber would appear transparent, our lighting circuits would appear as lines of light, and each stroke of an engine, or each thump of a belt driving a dynamo would cause a flicker in the radiant beams shining from the wire. It is possible and highly probable that in the future we shall discern the means of producing a sufficient number of alternate currents per second to cause special apparatus through which they are made to pass to glow with waves of light generated without accompanying heat. The investigations of Mr. Tesla, and the researches of many investigators, make this result probable, and, when this time has come, light will be the cheapest force at command. I am aware of the difficulties attending the popular treatment of such a subject, and the impossibility of expressing clearly the half understood relations existing between the forces of nature, the ether and matter. We regard the various forms of energy—heat, light, etc.—as conditions of the ether, the ether something which can be pushed or strained, but not materially changed, and matter as something contained in the ether whose sole duty seems to be to cause a change in these ether motions and, consequently, a local appearance of energy.

A few years ago we were accustomed to associate electricity with a wire and a battery, or a Leyden jar or a something; to-day we believe the wire to be but an incidental instrument in the propagation of energy, a something which makes its presence known through a particular distance or in a particular space. A few years ago we inadvertently conceived that we *made or generated* electricity; to-day we consider that the universe is an infinite sea of energy in which all matter is but incidental, all bodies but temporary or momentary constructions through which or by which this unseen energy may become apparent to our senses.

The certainty of these facts presents to my mind the greatest of possible benefits for our future race. Not only is there opened an avenue of communication from one extremity of the universe to the other, from the distant star to this planet a pathway opposing no resistance to the speeding waves of energy, but it seems almost to offer a physical link between the Supreme Ruler our race demands and His realm. May it not be conceived that the ether is the pathway over which the messengers of omnipotence reach organized matter?

The Electric Construction and Supply Company's New Meter.

The Electric Construction and Supply Company, 18 Cortlandt street, New York city, makers of the famous "Ward" arc lamp, have added a meter to their line of specialties. They have purchased the patents of Messrs. Pilkington and White, the inventors of the meter described herewith.

Two great *desiderata* in an efficient electric meter are that it shall consume as little energy as possible and that it shall not be liable to derangement. With these objects in view,

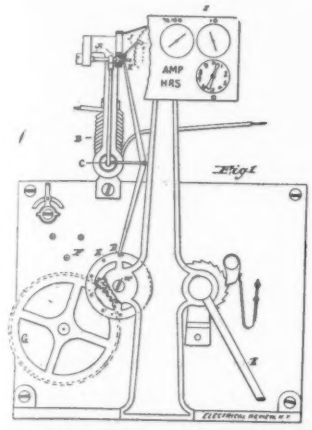


FIG. 1.—THE ELECTRIC CONSTRUCTION & SUPPLY COMPANY'S NEW METER.

Messrs. Pilkington and White have produced a device in which the only energy used is that consumed by a few turns of stout wire, forming an ammeter coil, shifting a light brass needle arm. The work of registering is performed mechanically by a 40-day clock movement, something new in its way, specially designed for this work. The movement is sealed so as to make it dust-proof and keeps in continuous rotation a disk provided circumferentially with a series of pins, parallel to the axis of the disk. The pins are of gradually increasing lengths, and the ampere needle is arranged so that when the coil is energized the needle will be shifted in a direction parallel to the pins and lie in their path so that one or more pins will engage the needle according to the degree of its deflection. A specially important feature of the apparatus is the clock movement, which requires winding only at very long intervals, when the meter is inspected. As the inspector's calls are made once a month, the 40 day movement gives ample assurance that the current will be registered between inspector's visits. The register indicates directly the number of ampere hours the lamps have been burning, and this may be read by the consumer as well as the representative of the electric lighting company. It will, therefore, be more satisfactory to the public than chemical meters, for they can watch the meter from time to time and prevent waste on the part of servants or employés.

Fig. 1 is a front view of the mechanism, Fig. 2 a side view of the same, and Fig. 3 a perspective. A 40-day clock in a dust-proof case drives, by gear G and pinion F, the disk E, which carries curved pins as D, and which disk is mounted on a phosphor bronze shaft centered at M and M^1, Fig. 2. At B is an ammeter solenoid. Swinging from centers A is its light soft iron gear, carrying at C a fixed bracket, at the upper end of which is freely pivoted a light lever. This lever is forked at the upper end to embrace the steady pin K, and has a pawl J engaging the ratchet wheel I of a dial train. The action is as follows: The movement is wound by removable crank key H, and for 40 days turns disk E around at the rate of five times an hour. In this disk is set a pin for each one-half ampere of the meter's capacity, making, in this case, 10 pins. These are of various lengths corresponding to the calibration of the instrument. When, say, one-half ampere is passing on the coil B the ammeter moves and carries the lever to a position where it will be struck by the first pin D, Fig. 2, once in every revolution of disk E. For every additional one-half ampere the arm will move over further and another pin will come into action, until, at five amperes, the full number here come into play. It will be readily seen that the lever, by being pivoted on bracket C and guided at center K, forms an integral part of the ammeter core, at the same time possessing its own plane of rotation at right angles to the latter. Therefore, when the pin D, moving to the left, carries the lower end of the lever in the same direction, the upper end of pawl J advances a ratchet wheel I a distance of one tooth, then D releases the lever and it drops by gravity into position to engage the next pin. Thus at five amperes the lever will transmit to the wheel ten impulses per revolution of disk, or 50 per hour. This wheel has 100 teeth and is geared even with the unit's dial, so 50 impulses means one-half a revolution of unit's dial, or five ampere hours. The lever, being retained only a few seconds by each pin, is always ready to take up a new position as the load is varied. Supposing the load to drop to one ampere, the ammeter falls back and two pins only will engage the lever, recording thereby ten teeth in an hour, or one ampere hour. This meter is suited to any circuits, induces no drop, requires almost no electrical power to run it, and is not affected by short circuits. The case is iron, insuring freedom from outside instruments, and the current may be reversed, as it is frequently in practice, without affecting the reading. The different capacities all come in the same size case, a very desirable feature when numbers of them are handled. It has been patented in the United States, Canada, Great Britain, Germany, France and Belgium. This explanation refers to size No. 1, five amperes capacity.

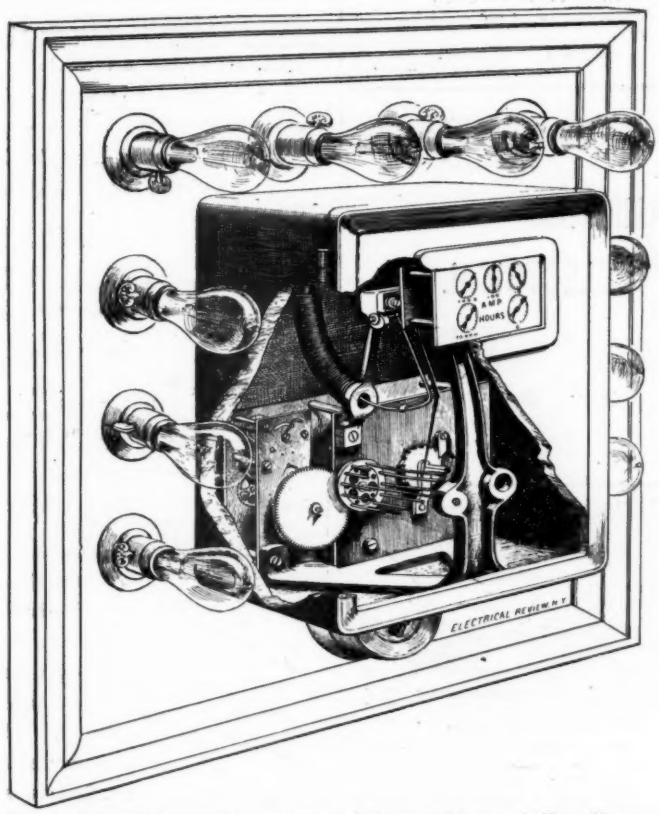


FIG. 3.—THE ELECTRIC CONSTRUCTION & SUPPLY COMPANY'S NEW METER.

OUR LONDON LETTER.

The Brush Electrical Engineering Company.—We perceive that Mr. L. Alwyn, who was recently in charge of Messrs. Laing, Wharton & Down's city installation work, has been appointed their sole city agent at 53 Queen Victoria street.

Electric Launch Progress.—The General Electric Power and Traction Company have this week launched three electric boats for use on the Manchester ship canal. Two others are built for the Thames service, and it is expected that a number of these boats will appear at Barnes in a few days on the occasion of the University boat race.

Messrs. Johnson & Phillips.—The well-known electrical engineers, Messrs. Johnson & Phillips, have devoted a special department in their extensive works to cable machinery. This is a class of manufacture that must rapidly increase under the present extension of electric lighting, and these enterprising gentlemen have, in addition to the industries at home, erected large factories at Milan, Calais and Grammont, for the manufacture of insulated cables and wires and vulcanized rubber.

That is Rather a Good Story concerning the director of the Vienna Telephone Company. This gentleman, according to the report of his employés, gave orders that he should be informed whenever the Emperor talked through the telephone to a member of the privy council, or Minister of State communicated with each other, or bankers and merchants whispered their financial secrets. Then he attended secretly and took his notes. He did not, however, confine his attentions to the sterner sex, but relieved the dull monotony of his work by occasionally recurring to the society of the ladies, and in this way the ecclaircisement came about.

Electric Lighting Progress in the City and Elsewhere.—Electric lighting is spreading around us in every direction with wonderful rapidity. In the city Sir John Bennett's splendid establishment in Cheapside is being fitted up by Messrs. Verity, of Covent Garden. Also, in the same busy thoroughfare, the premises of Messrs. Reeves are being fitted up, by Mr. John O. Grant, of Finsbury Pavement, the offices of the River, Plate, Trust, Loan and Agency, Moorgate street, by Messrs. Croggon, of Upper Thames street, and those of Messrs. Vivian, Young & Bird, Leadenhall street, by Messrs. Laing, Wharton & Down, of New Bond street. It would be impossible to follow in detail the wonderful development that is taking place, not only in the metropolis, but throughout the United Kingdom. Brighton, Bristol and other towns in England are asking for tenders. Leeds, Nottingham and Glasgow call on their civic authorities. The corporation of Londonderry invite applications from mechanical engineers, and the Hotel Metropole, in Dublin, has been placed in the hands of the Electrical Engineering Company of Ireland. Nor is it only municipalities or large communities that are thus affected, but even private individuals are catching the spirit of the time. His grace, the Duke of Montrose, has decided to light Buchanan Castle by the electric light, and the engineers engaged for the work, Messrs. Drake & Gorham, employ the water power which is very abundant in the locality.

The Telephone.—This question at present occupies a large share of attention in the commercial world of London. Last week a very influential deputation from the London Chamber of Commerce waited upon the Postmaster-General, to urge upon the consideration of Her Majesty's government the advantages that would attend increased facilities for telephonic communication, and to beg the immediate removal of the restrictions imposed upon it by the post office. These restrictions absolutely cripple the telephone companies, so that while they have a large business among the general public in Germany and France, a very small proportion of our population have ever used or even seen a telephone. On the following day, Sir J. Ferguson (the Postmaster-General), in his place in Parliament, made a statement defining the policy of the government upon the subject. They would, he said, introduce a system establishing free communication between the telephone and telegraph wires; but would retain possession of the trunk wires and of the junction of the telephone exchanges with the trunk lines. He, therefore, declined to accept the amendments suggested by the deputation, but promised that the government would shortly take the matter into their own hands As, however, their hands are already fairly full of contested matter, and their time is near its end, it would appear there is only a poor prospect of legislative action in favor of the telephone. Still, we have an assurance of progress in a circular just now received, headed "Improved Service for London—Large Reduction in Telephone Rates." The title is "The Pioneer Telephone Company." Their system is that of twin wires, insuring clearness of speech, freedom from disturbing noises and absolute privacy, and they are supplied with the newest switching apparatus for rapidity in connecting and disconnecting. This system has been in successful operation in Manchester for nearly a year.

The Crystal Palace Electrical Exhibition.—The electrical exhibition at the Crystal Palace has, as we anticipated, proved a decided success and daily attracts admiring crowds. The department which enjoys the greatest amount of popular favor is doubtless that devoted to culinary operations; and many who under ordinary circumstances would not have thought of eating or drinking during their visit to the establishment, eagerly gather round the the tables, in order that going home they may say they had partaken of food cooked by electricity. The universal applicability of the fluid as illustrated here is particularly delightful to the practical and domestic Briton, especially now that gas rates are running up, and there is much talk of the exhaustion of our coal mines. However, the high and influential patronage the exhibition has enjoyed is evidenced by the names of the gentlemen who have consented to serve on the jury who will presently proceed to distribute the awards. There are no more distinguished men in commerce, literature or science, than: Prof. W. Grylls Adams, D. Sc., F. R. S.; Prof. W. E. Ayrton, F. R. S.; Mr. Shelford Bidwell, M. A., F. R. S.; Mr. Conrad Cooke, M. Inst. E. E.; Major General Festing, R. E., F. R. S.; Prof. W. Crookes, F. R. S.; Mr. W. B. Esson, M. Inst. E. E.; Prof. George Forbes, M. A., F. R. S.; Capt. Sir Douglas Galton, K. C. B., D. C. L., F. R. S.; Dr. J. H. Gladstone, F. R. S.; Mr. J. H. Greathead, M. Inst. C. E.; Mr. Charles Hall, M. Inst. E. E.; Prof. D. E. Hughes, F. R. S.; Sir Henry Mance, C. I. E.; Mr. W. H. Massey, M. Inst. C. E.; Mr. W. H. Preece, F. R.

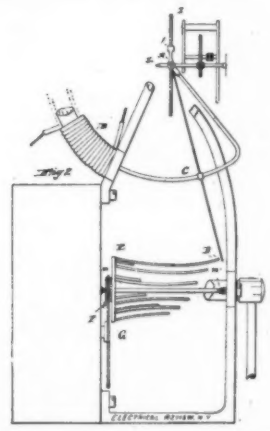


FIG. 2.—THE ELECTRIC CONSTRUCTION & SUPPLY COMPANY'S NEW METER.

S.; Mr. A. Reckenzaun; Prof. Henry Robinson, M. Inst. C. E; Capt. Sankey, R. E., M. Inst. E. E.; Mr. C. E. P. Spagnoletti, M. Inst. C. E.; Mr. James Swinburne, M. Inst. E. E.; Prof. Silvanus Thompson, D. Sc., F. R. S.; Mr. J. Tomlinson, M. Inst. C. E.; Prof. W. C. Unwin, B. Sc., M. Inst. C. E.; Major General Webbe, C. B., R. E.; Mr. J. W. Wilson, M. Inst. C. E.

FRENCH.

London, April 2.

Electric Wiremen to Strike.

The Electric Wiremen's Union, of this city, is reported to have ordered a strike of its members throughout the city for an advance of wages. The men have been receiving $1.50 and $2.50 a day, and they want $3. Only two firms granted the demand for an increase of wages when it was made. The strike is to go into effect Monday, and will bring out about 300 men.

KINDRED INTERESTS

The Revere Rubber Company, Chelsea, Mass., is sending out attractive printed matter referring to its well known product "Flexite."

Barton & Brown will remove their patent law offices May 1, 1892, to rooms 1428-1430 Monadnock building, 260 Dearborn street, Chicago.

The Buffalo Office of the Edison General Electric Company has issued a pretty folder calling attention to the establishment of a branch of its fixture and decorative bronze department.

The Edison Light and Power Company, Minneapolis, Minn., recently started a 300 horse-power Ball engine, cross compound, furnished by the Ball Engine Company, Erie, Pa. The engine gives great satisfaction.

The Central Electric Company, Chicago, are making preparations to put on the market an absolutely dust-proof bell, one that will be perfect in every respect, the details of which will be fully illustrated in this journal.

Th Germania Electric Company, Boston, has issued the following notice:

Having removed our manufacturing departments from Cambridgeport to our new factory at Marlboro, Mass., please notice that any shipments for our account should be made to us at Marlboro, Mass.; all correspondence to be addressed, as heretofore, to our office, 505 Exchange building, Boston.

H. T. Paiste, of Philadelphia, the manufacturer and patentee of the Paiste switch and other specialties, has sold to the Bryant Electric Company, of Bridgeport, Conn., his patents on the Paiste single pole switch, together with the business of the same. The transfer took place April 1. Mr. Paiste continues in the specialty line, and will introduce shortly to the electrical trade a number of new devices that he thinks will be appreciated by all.

F. P. Little & Company, Buffalo, N. Y., have just closed a contract with the Connecting Terminal Railroad Company, of Buffalo, for installing a plant, consisting of one 500-light Thomson-Houston dynamo, one 38 horse power engine of the John T. Noye Manufacturing Company's make, 24 2,000 candle-power Mosher arc lamps and 125 sixteen candle-power incandescent lamps, all equipped complete ready to operate. They have lately closed a contract for wiring the Columbia bank building, of Buffalo, for incandescent lights. Business is very brisk with this enterprising firm at present. They are wiring the city elevator for 300 incandescent lights and five arc lights, complete, with engine, dynamo, etc.; and also the Bell Telephone Company's building for 150 lights, and rewiring Weyand's brewery for 225 lights.

FOR SALE.

STEAM and hand Geisler pumps for sale, in good repair.

Apply to

GERMANIA ELECTRIC CO.,

Marlboro, Mass.

FOR SALE.

QUICK, FOR CASH—One 16 inch by 16 inch, latest type, 150 Horse-Power Ball Engine, has been in temporary use three months and is without scar or blemish, and so guaranteed by the makers and by ourselves.

J. W. PARKER & CO.,
38 South Fourth St., Philadelphia, Pa.
PHILADELPHIA AGENTS BALL ENGINE.

OFFICE OF THE LIGHT-HOUSE ENGINEER, THIRD DISTRICT.
TOMPKINSVILLE, N. Y., March 26, 1892.

SEALED PROPOSALS will be received at this office until 12 o'clock M., Monday, the 25th day of April, 1892, for furnishing Miscellaneous Articles for the Light-House Establishment. The articles needed consist of twenty numbered lots, embracing, respectively, Charcoal and Cumberland Coal; Building Material; Engineers' Supplies; Hardware, Tools, etc.; Iron and Steel; Belting; Graphite Paints, etc.; Lumber; Boiler Covering; Plate Glass; Galvanized and Russia Sheet Iron, Tin, Solder, Sheet Zinc and Iron Wire; Sheet Brass and Copper; Composition, Brass and Nickel Castings; Bells; Acids; Iron Castings; Sheet-Iron Smokestacks for Boilers; Electro-plating Supplies; Shooks for Oil Supply-Boxes; and Miscellaneous Articles; all of which are enumerated in the specifications attached to the form of bid, which may be obtained on application to this office. Samples may be seen or information obtained at this office concerning any article not sufficiently described in the specifications. Bids will be received for one or more numbered lots complete. Envelopes containing proposals should be indorsed "Proposals for Miscellaneous Articles." The right is reserved to reject any or all bids, to strike out any item or items in the specifications, and to waive any defects. Bidders are invited to be present at the opening of proposals. D. P. HEAP, *Major of Engineers, U. S. A., Engineer Third Light-House District.*

BIDS FOR PUBLIC LIGHTING.

One, three and five year bids for lighting the streets and city buildings of the City of Burlington, Iowa, with sixty (60) or more arc lights of 2,000 candle-power each, and 250 or more incandescent lights of 20 or more candle-power each, will be received at the office of the City Clerk until April 18, 1892.

All bids to be accompanied by a good and sufficient bond in the sum of $5,000 for the faithful performance of the bid.

The Council reserves the right to reject any or all bids.

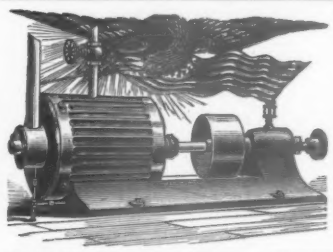
HENRY RITTER,
Chairman of Gas Committee.

Robb MacKie,

CONSULTING
ELECTRICAL
ENGINEER,

Neave Building,

CINCINNATI, O.



AMERICAN HIGH SPEED ENGINE, built of any required size and power, for all stationary and marine purposes. Makes 1000 or more revolutions per minute. Has no dead centers. Unequaled regulation. No skilled engineer required! Cheap! Economical! Simple! Durable!

For further information and Illustrated Catalogue, call on or address: AMERICAN ENGINE CO., Bound Brook, N. J.

The Best Work
BY THE
Simplest Means
IN THE
Shortest Time

IS
Accomplished
BY THE
Remington
Standard Typewriter.

Send for Illustrated Catalogue.

Wyckoff, Seamans & Benedict,
327 BROADWAY, NEW YORK.

Burnley Dry Battery

PATENTED JAN., 1890.

STRONGER than any Open Circuit Battery on the Market. **BETTER** than any other Dry Battery yet produced. Most compact in size and cheapest. 90 cents per cell. Discount to the Trade and in quantities.

J. H. BUNNELL & CO.,

Sole Manufacturers and General Agents,

76 CORTLANDT ST., N. Y.

MACHINERY IN STOCK.

Engine Lathas, 10 in. x 4 ft.; 11 in. x 5 ft.; 12 in. x 6 ft.; 14 in. x 6 ft.; 16 in. x 6 ft.; 18 in. x 8 ft.; 20 in. x 8 ft., with tapes attachment; 22 in. x 12 ft. and 14 ft.; 24 in. and 26 in. x 16 ft.; 30 in. x 10 ft. and 18 ft.; 36 in. and 38 in. x 20 ft.; 42 in. x 12 ft.; 27 in. x 32 ft.; 88 in. x 31 ft.; 96 in. x 20 ft. Fox Lathes, 13 in. x 5 ft.; 14 in. x 5 ft.; 15 in. x 6 ft.; 18 in. x 6 ft. Turret Lathes, 12 in. x 5 ft.; 14 in. x 5 ft.; 15 in. and 16 in. x 6 ft.; 18 in. x 6 ft.; 36 in. x 8 ft.

Planers, 16 in. x 16 in. x 3 ft.; 20 in. x 20 in. x 4 ft.; 24 in. x 24 in. x 6 ft.; 30 in. x 30 in. x 6 ft.; 36 in. x 36 in. x 10 ft.; 42 in. x 42 in. x 12 ft.; 44 in. x 48 in. x 22 ft.; 60 in. x 49 in. x 24 ft.

Friction Shapers, 15 in., 16 in., 20 in., 22 in., 32 in. Crank Shapers, 6 in., 8 in., 10 in., 12 in., 13 in., 16 in., 17 in., 20 in., 24 in., 28 in.

Screw Machines, Nos. 1, 2, 3, 4, with or without Wire Feed.

Screw Machines, Nos. 5, 6, 7, 8, Power Feed.

Presses, Nos. 51, 52, 53, Ferracute; Nos. 1, 2, 3, Stiles & Parker.

5 Lincoln Pattern Millers, No. 2.

Hand Millers, Nos. 1 and 2. 3 Cam Cutters.

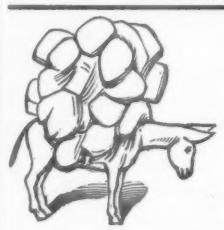
Bolt Cutters, ¼ in. to 1 in., ½ in to 2 in.

2 Profiling Machines. 1 36 in. and 48 in. Gear Cutter.

C. D. and E. Horizontal Boring Machine. Newark Machine Tool Co.

Send for List of New and Second-Hand Machinery in Stock.

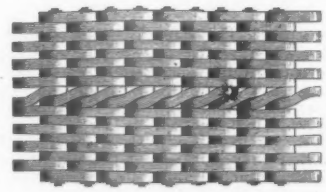
PRENTISS TOOL & SUPPLY CO., P. O. Box 3362,
115 Liberty Street, New York.
59 South Canal St., Chicago, Ill.



Overloaded and disordered Batteries are a common and painful sight. Why? Because they are not built to work, but to sell. Are you a sufferer? Then substitute the LAW BATTERY and suffer no more.

SOLE MAKERS,
LAW TELEPHONE CO.,
85 John Street,
NEW YORK.

LEATHER LINK BELTING.



Pat. "American Joint."

SEND FOR REDUCED PRICES.

American Leather Link Belt Co.,

MANUFACTURERS,
72 Cliff St., New York.

ELECTRICAL PATENTS

INDEX OF INVENTIONS FOR WHICH LETTERS PATENTS OF THE UNITED STATES WERE ISSUED ON MARCH 30, 1892.

472,026 Galvanometer. 472,027 Switch and switch-box; Sigmund Bergmann, New York, N. Y., assignor, by mesne assignment, to the Interior Conduit and Insulation Co., same place.

472,037 Thermo-electric element; Edward N. Dickerson, New York, N. Y., assignor to the Thermo-Electric Co., of West Virginia.

472,055 Carbon holder; Henry Howard, Halesowen, near Birmingham, England.

472,062 Rheostat; James R. Masury, Providence, R. I., assignor of one-half to Lawrence J. McCarty, Boston, Mass.

472,064 Electric arc lamp; John A. Mosher, Chicago, Ill., assignor to the Mosher Arc Lamp Co., Abilene, Kans.

472,084 Safety cut-out; Mandeville Thunn, Louisville, Ky.

472,124 Electric recording device for compasses; Charles L. Jaeger, New York, N. Y.

472,135 Lightning arrester; Edward G. Miller, Wilkinsburg, Pa.

472,169 Toll collecting apparatus for telephones; Jesse J. Kato and Thomas H. Rhodes, Los Angeles, Cal.

472,193 System of electrical distribution; Wm. Marshall, New York, N. Y.

472,220 Hanger for electric wires; Henry H. Luscomb, Boston, Mass.

472,222 472,223 Power transmitter; Francis C. Osborn, Detroit, Mich., assignor of three-fourths to George Maitland, Joseph A. Marsh, Ralzemond A. Parker and Charles F. Burton.

472,237 Unison apparatus for printing telegraphs; Henry Van Hoevenbergh, New York, N. Y.

472,243 Telephone transmitter; Edward G. Acheson, Pittsburgh, Pa.

472,261 Thermo-electric battery; Robert J. Gülcher, Berlin, Germany.

472,265 Electrical meter; John F. Kelly, New York, N. Y.

472,274 Electric arc lamp; Samuel W. Rushmore, Brooklyn, N. Y.

472,283 Switch-box for electric motors; Parvin Wright, Denver, Colo., assignor of one-half to Joseph W. Kinsey, same place.

472,326 Automatic telegraph; Frank Anderson, Peekskill, N. Y., Annie L. Anderson, administratrix, and Gilbert H. Anderson and Homer Anderson, administrators of said Frank Anderson, deceased.

472,329 Electric wheel locking device; George W. Blanchard, Waterville, Me.

472,346 System of arc lighting; Horatio A. Foster, New York, N. Y.

472,352 Compound for insulating electric wires; Louis Hill, Waterbury, Conn.

472,359 Electric indicator for railroad blocks; Robert W. Jaggard, Philadelphia, Pa.

472,379 Production and distribution of electricity; William Marshall, New York, N. Y.

472,417 Coin-controlled apparatus for gramophones; Edward L. Wilson, New York, N. Y.

472,439 472,440 Annunciator; William C. Dillman, Brooklyn, assignor to Owen Walsh, New York, N. Y.

472,444 Electric mining pick and drill; John Fish, South Bend, Ind., assignor of one-half to George M. Fish and Manning Fish, Joliet, Ill.

472,447 Inclosed supply system for electric railways; John C. Fyfe, Denver, Colo.

472,461 Electro-magnetic valve-controller; Olof E. Lundstedt, Brooklyn, N. Y., assignor, by mesne assignments, to the New York Electrical Device Co., of Virginia.

472,464 Switch and signal operating apparatus; Geo. H. Pfeil, Easton, Pa., assignor to the National Switch and Signal Co., same place.

472,466 Rotary transmitting dynamometer; Franklin Van Winkle, Paterson, N. J.

472,480 Adjustable armature for electro-magnets; Emil Hofmann, Ballard Vale, Mass., assignor to the Craighead & Kintz Co., same place.

472,494 Automatic electric lamp lighter and extinguisher; John H. Caughy, Baltimore, Md., assignor of one-half to Frank J. Caughy; same place.

472,500 Electrical indicator; John W. Henderson, Philadelphia, Pa., assignor to the Wharton Railroad Switch Co., same place.

DESIGN PATENT.

21,445 21,446 Case for electrical measuring instruments; Edward Weston, Newark, N. J.

JOHN A. BARRETT,
ELECTRICAL ENGINEER & EXPERT,
13 PARK ROW,
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